G. E. FOUNDS NATIONAL TOPPERS ORGANIZATION FOR LEADING SALESMEN

THE Refrigeration Department of General Electric Co., Cleveland, has created a national organization, "The Toppers' Club," for its retail salesmen. Membership and rating in the club are determined by the amount and number of sales.

The Toppers' Club is divided into three parts. A salesman becomes eligible for membership in the Junior chapter by successfully meeting an assigned monthly quota. As a member of the chapter he is entitled to a paid life insurance policy. He is also awarded a special identification pin which will permit attendance at a party or entertainment to be given the first day of each month.

Membership in the second division of the Toppers' Club depends upon a record of a minimum sale of 25 kilowatts (1 kilowatt—$1,000 sales value). A Topper is automatically entitled to an honorary membership, with full privileges and insurance, in the Junior chapter during the following year. A special pin and business cards, with the embossed seal of the Toppers' Club, will identify members. An individual club certificate will also be awarded to a Topper by the Refrigeration Department of General Electric Co.

The highest order of the club is composed of cabinet members. The one hundred and forty leading salesmen in the country constitute the cabinet. These members will be guests, with all expenses paid, of the Refrigeration Department at its convention which will be held in Cleveland, Ohio, next February. Cabinet members also enjoy all rights and privileges of the two lower orders.

GEORGIA POWER SALES NEARS $300,000 MARK IN REFRIGERATION DRIVE

Georgia Power Co., Atlanta, Ga., reports that on September 17 sales in its fall electric refrigerator drive reached a total of $297,246, or 91.4 per cent of its quota. The campaign opened on September 3 and will close on October 5, during which time a quota of $300,000 has been set as the goal.

Atlanta stores report sales amounting to $173,964, or 115.9 per cent of their quota. The Rome division is following the leader, with sales aggregating $28,448, or 107.8 per cent of its quota.

NEW YORK STATE SEEKS BIDS FOR HOSPITAL REFRIGERATION JOBS

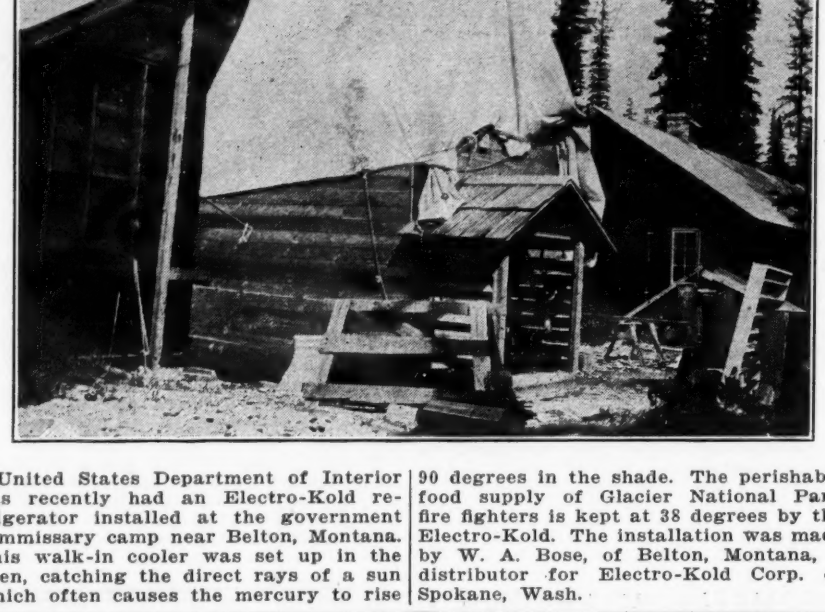
Bids will be opened by the Commissioner of Mental Hygiene at the Capitol, Albany, N. Y., October 9, for refrigeration work for tuberculosis pavilion, and for the reception hospital (2 jobs) at the St. Lawrence State Hospital, Ogdensburg, N. Y.

Bids will be opened by the Commissioner of Mental Hygiene on October 16 for refrigeration work, buildings 4 and 39, Rockland State Hospital, Orangeburg, Rockland County, N. Y.

BLINN JOINS LITTLE ROCK SERVEL DISTRIBUTOR

William R. Blinn, electric refrigeration service engineer, has been placed in charge of the Servel electric refrigeration division of 555, Inc., which recently took over the distribution of Servel in Little Rock and Arkansas. Mr. Blinn has been with Servel for the past five years.

Food Supplies of Glacier Park Fire Fighters Kept at 38 Degrees



United States Department of Interior has recently had an Electro-Kold refrigerator installed at the government commissary camp near Belton, Montana. This walk-in cooler was set up in the open, catching the direct rays of a sun which often causes the mercury to rise 90 degrees in the shade. The perishable food supply of Glacier National Park fire fighters is kept at 38 degrees by the Electro-Kold. The installation was made by W. A. Bose, of Belton, Montana, a distributor for Electro-Kold Corp. of Spokane, Wash.

LITERATURE OF MANUFACTURERS

Catalogues, bulletins and other direct advertising material recently issued.

Manufacturers are requested to send copies of new trade literature promptly to Electric Refrigeration News.

Commonwealth Brass

Catalog No. 36 issued by the Commonwealth Brass Corp., Detroit, Mich., shows its line of seepage proof pipe and tube fittings for automatic refrigeration. Several charts in the catalog illustrate the differences between cast and forged fittings. The Commonwealth line includes forged and rod nuts, tube unions, multiple connectors, tubing adapters, elbows, tees, crosses, plugs, caps, nipples, strainers, hose connectors and sealing bonnets.

Ferro Enamel

The Ferro Enamel Supply Company, Cleveland, Ohio, has issued a folder which contains a short description of three Ferro continuous furnaces, rotary type, that were installed at the American Radiator Company enamel plant in Buffalo in 1926.

Gem Appliances

Gem Appliances, Inc., New York, N. Y., has sent in a folder describing the uses of the Gem Kitchen Mechanic. This machine weighs about forty pounds, stands about 17¼ inches in height, and is finished in cream lacquer.

SERVEL OFFERS 108 FROZEN DESSERT RECIPES

Servel Sales, Inc., Evansville, Ind., has published a book containing 108 recipes which can be made by the use of the Electrolux refrigerator and the Sparklet syphon.

The recipes are divided under the headings of entrees, beverages, salads, parfaits and mousses, and ice creams. Directions are given for the use of the Sparklet syphon in the making of ice creams and beverages.

At the end of the book, instructions are given for the use and operating of the Electrolux refrigerator.

FREIMANN TRANSFERRED BY FRIGIDAIRE CORP.

Andrew Freimann, formerly with the Frigidaire Sales Corp., Detroit, is now handling sales engineering work in southern territory for the Frigidaire Corp., Dayton, Ohio.

REQUESTS FOR INFORMATION

Readers who can assist in furnishing correct answers to inquiries, or who can supply additional information, are invited to address Electric Refrigeration News, referring to the query number.

Consulting Engineers

Query No. 284—"Please wire names of two consulting refrigerating engineers, not sales engineers, competent to analyze and make recommendations for meat cooler installations for chain grocery stores."

Note—On account of the very rapid development and recent improvements in equipment for meat cooling applications, the NEWS would advise prospective purchasers to secure recommendations covering details of installations from leading manufacturers of commercial electric refrigerating machines and cabinets. There is a demand, however, for independent consulting engineering service. The requirement is for competent, but unprejudiced, engineering talent to pass on proposals of competitive manufacturers. The NEWS invites correspondence from consulting engineers having such qualifications.—Editor.

Superior Electric Refrigerator

Query No. 285—Information is desired regarding parts such as valves, gaskets, etc., used in the Superior electric refrigerator formerly manufactured at Canton, Ohio. Suppliers please write.

Foreign Buyer

Query No. 287—An Australian manufacturer of electric refrigerators (name furnished on request) writes: "We wish to receive tenders from manufacturing firms for the following list of materials. Please send full specifications and quote prices."

Bright annealed copper tubes ⅛", ⅜" and ¼" outside diameter, 18 and 20 gauge.
Copper sheets tinned one side, 18 and 20 gauge.
Ice trays.
Cooling units for methyl chloride, with and without float control.
Expansion valves for methyl chloride.
Condensers.
Cabinet hinges and locks.
Thermostats.
Mercury tube switches.
Bimetal for thermostats .036 thick.
Household, commercial cabinets, and display counters, suitable for fitting electric refrigerators.
Ice cream cabinets for remote methyl chloride units.
Wire shelves.
Shelf support pins.
Brass valves and unions.
Methyl chloride compressor.
Methyl chloride.
Gasket rubber and rubber belts.
Pressure gauges.
Grapho bronze suitable for bearing and seal rings.
For ice cream cabinets and lids: Monel metal sheet, 20 gauge. Ebonite or Bakelite suitable for sleeves and rings.
Automatic gas controlling apparatus for small absorption machines.
Absorbents for ammonia or sulphur dioxide refrigerating machines.

Rubber Ice Cube Trays

Query No. 286—"Will you please furnish us with the name and address of the company that manufactures rubber grids for mechanical refrigerators."

Query No. 288—"Can you give us the name of the concern which handles ice trays with rubber linings for the Servel refrigerator? We would like to receive prices on five single trays for cubes, one double and one triple depth trays for desserts. The dimensions of the single tray are 4¼" x 10" x 1¼". For the larger trays the depth 1¼" will be doubled and tripled."

Answer—G. M. Dwelley, Inc., 2842 W. Grand Blvd., Detroit, Mich., are exclusive distributors for Flexo tray, the rubber ice cube tray.

WILLIAMS EXPORTS GAIN 200 PER CENT THIS YEAR

Recent export shipments of Williams Oil-O-Matic Heating Corp., Bloomington, Ill., products were to Riga, Latvia, the Argentine, Hamburg, and India, according to announcement by C. U. Williams, president.

"This brings our total foreign representation to 33 countries," he said. "Export business to September 20 was 200 per cent ahead of the same period in 1928."

A. M. TAYLOR NOW WITH U. S. RUBBER COMPANY

A. M. Taylor, formerly advertising manager of Copeland Products, Inc., Detroit, Mich., has recently joined the advertising department of U. S. Rubber Co., Detroit.

FRIGIDAIRE SALES MANAGERS HOLD TWO DAY CONFERENCE

Sixty Frigidaire sales managers from various parts of the country held a two-day conference at Dayton, Ohio, on September 23-24. A second group of managers will convene on October 3-4.

HARTFORD ELECTRIC CO. FETES NEW MANAGER

N. E. Peacock, Providence, R. I., recently appointed manager of the Hartford, Conn., office of the Electrolux Company, 321 Main Street, was given a dinner September 13 by salesmen and office associates at the Wooster Shoppe, Hartford. Edward Theibodeau, division manager for Electrolux, was the guest of honor.

"EDDIE" GUEST ENTERTAINS G. E. MEN IN DETROIT

"Eddie" Guest, nationally known poet and newspaper man, was the headliner on the program of the Michigan General Electric dealers' banquet held at the Statler Hotel Tuesday evening, September 17. A. L. McCormick, general manager of the Electric Utilities Corporation, was toastmaster.

WAGNER ANNOUNCES OPENING OF TEXAS BRANCH OFFICE

Wagner Electric Corporation, St. Louis, announces the opening of a new branch sales office at 734 Allen Bldg., Dallas, Texas, to cover the state of Texas and parts of Louisiana and Arkansas.

This new office will be in charge of Alfred B. Emrick, former Pittsburgh branch manager. Mr. Emrick was graduated from Pennsylvania State College in 1913, spent two years with General Electric, and then joined Wagner Electric in 1915. He was a salesman in Detroit and Toledo districts until 1921, then went into business for himself. In 1926 he rejoined Wagner, and early in 1927 was appointed branch manager of the Pittsburgh office, from which he was transferred on September 1, 1929, to take charge of the Dallas sales office.

ELECTRO-KOLD SHIPMENT TO HAWAIIAN ISLANDS

Electro-Kold Corp. made its initial shipment of refrigerators to the Hawaiian Islands, when a large consignment left Spokane, Washington, September 13.

THE CONDENSER

ADVERTISING RATE fifty cents per line (this column only).

SPECIAL RATE if paid in advance — Positions Wanted — fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each. All other classifications—fifty words or less, one insertion $3.00, additional words six cents each. Three insertions $8.00, additional words sixteen cents each.

POSITIONS AVAILABLE

MANUFACTURER of nationally advertised line of electric refrigeration cabinets seeks salesmen for New York Metropolitan District. Liberal drawing account to apply on commissions. Write stating previous experience, etc. Box 198.

DISTRICT MANAGERS AND SALESMEN WANTED

Exceptional opportunity for men 30 to 50 years of age with meat experience or experience selling commercial refrigeration—freezer counters, coolers and grocery boxes on commission basis in territories east of Rocky Mountains.

Our plan provides for retail selling and through dealers. Large commissions. Overwriting paid to district managers in addition to commissions on personal sales. No investment necessary. Sales equipment, advertising, etc., furnished and full co-operation by factory.

All replies confidential. Give full details of past experience and qualifications for this commission.

HOLCOMB & HOKE MFG. CO.
INDIANAPOLIS, IND.

POSITIONS WANTED

CHIEF ENGINEER AVAILABLE—Ten years' experience in electric refrigeration with leading manufacturers in charge of engineering design and production methods. Wishes to communicate with manufacturer east of St. Louis. Box No. 180.

Thoroughly experienced service manager desires connection with manufacturer as traveling refrigeration service representative. Has full knowledge of service and installation organization work. Is qualified to conduct service instruction courses and develop service personnel of the dealers in territory. Unquestionable character and habits. Reference and full particulars furnished. Box 197.

THREE YEARS' EXPERIENCE at factory on service, two years as branch service manager, two years as district sales manager. Have been in the Minneapolis territory for past four years and have been connected with two of the leading electric refrigeration firms. Can give references from former connections. Consider any territory. Address, Box No. 196.

Patents Searches, reports, opinions by a Specialist in REFRIGERATION
H. R. VAN DEVENTER
Solicitor of Patents
Refrigeration Engineer
342 Madison Ave., N. Y.

CONTROLS
For the Refrigeration Industry
GOODNOW & BLAKE MFG. CO.
3840 Beaver St., Detroit, Mich.
Manufacturers of the
LASSEN CONTROL

The Imitation Food Products Co.
(Branch of The Artistic Production Co.)
107 Lawrence Street
Brooklyn, N. Y.
Ask for our catalog of May 1, 1929. Many new items. Greatly reduced prices. Direct sales only. "Indispensable with refrigerator display."

E. T. L. Service for Domestic and Commercial Electric Refrigeration
Testing and experimental laboratory service for Manufacturer, Distributor, Central Station — Test data exclusive property of client
ELECTRICAL TESTING LABORATORIES
80th Street and East End Avenue, NEW YORK CITY, N. Y.

Superior
The JURUICK LINE

A few good territories still open for responsible representatives qualified to install and service these machines.
In every feature . . with quality built into every detail . . silent, smooth performance . . automatic control . . simple design . . easy to operate . . economical . . easy for the dealer to sell.
The complete Juruick line includes machines up to 30 tons capacity
AMERICAN ENGINEERING COMPANY
2420 Aramingo Ave., Philadelphia, Pa.

Subscription Order

ELECTRIC REFRIGERATION NEWS,
550 MACCABEES BUILDING, DETROIT, MICH.

Please enter subscription to Electric Refrigeration News.

United States and Possessions:
☐ $2.00 per year. ☐ Three years for $5.00

All other Countries:
☐ $2.25 per year. ☐ Two years for $4.00

I am enclosing payment in the form of
☐ Check ☐ P. O. Order ☐ Cash

Name.....

Street Address.....

City and State.....

Remarks:.....

ELECTRIC REFRIGERATION NEWS

The business newspaper of the refrigeration industry

VOL. 4, NO. 3, SERIAL NO. 79 | Copyright, 1929, by Business News Pub. Co. | DETROIT, MICHIGAN, OCTOBER 9, 1929 | Entered as 2nd class matter August 1, 1927, at Detroit, Michigan. | PRICE FIFTEEN CENTS

BIG DAIRY INDUSTRIES EXPOSITION OPENS OCTOBER 21

A.S.R.E. MAKING BIG PLANS TO CELEBRATE 25th ANNIVERSARY

Research to Be Discussed at Opening Session

New York, Oct. 9.—The twenty-fifth anniversary of the American Society of Refrigerating Engineers (Headquarters, 37 West 39th St., New York, N. Y.) to be celebrated the first week in Decem- York, N. Y.) the first week in December, will be a high spot in the history of refrigeration, attracting the full attention of its various fields. This was the opinion expressed at the recent council meeting at the society headquarters, when the program committee outlined plans for this event.

The ceremony of the anniversary will be held on the evening of December 5th in the Engineering Auditorium, and will include the induction of three men prominent in the scientific world. These men, whose names will be announced shortly, have won distinction through efforts allied to progress in this field. In honoring them, as in the honoring of John E. Starr earlier in the year, the society is distinguishing those qualities which typify the engineer as a leader and engineering profession as a leader in the world at large.

The meeting will last four days, December 4, 5, 6 and 7, and will be held at the Pennsylvania Hotel and the Engineering Societies Building, 29 West 39th Street. Each session will be devoted mainly to some specific subject, such as ice plants, domestic refrigeration, cold storage, etc. There will be a joint session with the American Society of Mechanical Engineers.

At each of the technical sessions, a prominent industrialist will make the keynote address. This is a new arrangement and is intended to shed light on the present status of refrigeration in the many fields of activity and reveal something of its future possibilities.

The opening technical session will be a departure from custom. At this time attention will be drawn to the general subject of research policies in the refrigeration industries. The feature of this meeting will be the reading of the prize papers which were presented in the student research competition. The rest of the day will be devoted to reports, discussion of needed development, and several addresses to indicate the place of research in this and other allied industries.

The banquet and dance will be held Friday evening in the Pennsylvania Hotel. The committee is arranging for some very special talent to furnish the amusement for this affair.

A special council meeting of the A. S. R. E. will be held on November 15 to make final arrangements for this event. The society is extending an invitation to everyone interested in refrigeration to participate in this event.

GEORGIA POWER SMASHES $300,000 QUOTA IN FALL REFRIGERATION CAMPAIGN

Atlanta, Ga.—In the Georgia Power fall refrigeration campaign, which closes on October 5, the sales reported up to October 2 totaled $377,316. The campaign has been running since September 3, and it is the second refrigeration sales drive held this year. The drive has passed the $300,000 mark which had been set as the goal.

The Atlanta store, with a quota of $150,000, have turned in a total of $213,625. The outside districts have sold $131,795, which is 87.9% of their quota. The South Georgia Power Co. have sold $18,282 worth of refrigeration, and the Columbus Electric & Power Co. have reported sales totaling $13,614. These companies are affiliated with Georgia Power.

KELVINATOR SHIPMENTS SHOW MARKED INCREASE

Detroit—Kelvinator September shipments showed a 60 per cent increase in value over those of September, 1928, according to H. W. Burritt, vice-president in charge of sales for Kelvinator Corp.

Shipments were 45 per cent greater for the quarter ending September 30, 1929, than they were for the same quarter of 1928. Seasonal conditions did not cause as much of a decline in Kelvinator shipments from August to September of this year as they did in 1928.

N.E.L.A. Refrigeration Committee To Study Food Preservation Results

New York, Oct. 9.—The merchandising Bureau of the Commercial National Section, National Electric Light Association, will hold a meeting at the Westinghouse Lighting Institute, Grand Central Palace, 480 Lexington Ave., here Thursday and Friday, October 10-11.

The Refrigeration Committee, which is a part of the Merchandising Division, will meet at 10:00 a. m., October 10. C. L. Dunn, of the Ohio Public Service Co., Cleveland, is chairman.

This committee will consider the adoption of a method for accumulating the results accomplished by the National Food Preservation activity. It will also discuss ways and means for carrying on educational work and adopt a definite program for the Refrigeration Committee's work during the ensuing year.

In This Issue

Budget Control For Refrigeration Dealers. Page 19.

Dairy Equipment. Pages 4, 5, 10, 12, 15, 16, 23, 29.

Developments In Commercial and Multiple Installations. Page 18.

Industrial Water Cooling. Page 24.

Refrigeration Patents Issued, Aug. 27 to Sept. 24, Inclusive. Pages 30, 31.

Use of Small Units In Dairy Applications. Page 25.

DISTRIBUTORS MEET TO HEAR KELVINATOR 1930 SALES PROGRAM

600 Representatives Attend Big Convention

Detroit, Oct. 9.—Kelvinator Corp. is holding a two-day convention here for its distributing and branch organization. Between five and six hundred representatives are attending the convention, which opened yesterday. Headquarters are at the Book-Cadillac Hotel and the Little Theatre.

Speakers on the program at the opening session include President G. W. Mason, Vice-President H. W. Burritt, Sales Manager J. S. Sayre. At the banquet held at the Book-Cadillac Hotel Tuesday evening, G. W. Mason, president, selected for his subject, "Looking Ahead." Dr. W. S. Sadler, of Chicago, famous medical authority, diagnostician author of numerous books on medicine and psychology, lecturer and director of the Chicago Institute of Research and Diagnosis, delivered an address on "The Health of the Nation." Robert Ripley, of New York City, humorist and after-dinner speaker, entertained with "Believe It or Not."

(Continued on Page 8)

SEATTLE CODE WAITS PASSAGE BY COUNCIL

Provides for Inspection by Commissioner of Health

Seattle, Wash.—An ordinance relating to the installation of refrigerating systems has been drafted by city officials, approved by local refrigeration representatives and is now waiting to be passed by the city council.

The Seattle code deals with permits, fees, refrigerating machinery room requirements, piping, safety devices, tests and operating precautions.

If this code is passed by the council it will be unlawful to maintain or operate a refrigerating system without a permit and inspection.

Referring to refrigerating machinery room requirements, no fire, flame or arc lights and no major electrical equipment except motors and switchboard to operate refrigerating machinery will be permitted with systems using a flammable refrigerant. Closed and oil immersed switches must be used and an emergency switch controlling all refrigerating machinery must be located outside the refrigerating room.

Safety devices include pressure relief valves, pressure limiting devices and suitable conducting materials for refrigerants, which must be able to withstand certain test pressures.

No refrigerating system shall be placed in operation until the complete installation has been tested by the installer in the presence of the commissioner of health.

UNIFORM WARRANTY APPROVED BY N.E.M.A.

Form Offered to Members as Recommended Practice

Washington, D. C., Oct. 8.—Adoption of a uniform warranty as recommended practice for manufacturers of electric refrigerators to include in a guarantee bond or as part of a conditional sales contract, agreement to hold a conference on fair trade practices, agreement on certain controversial points in the proposed national safety code, and discussion of technical and market development problems were the outstanding results of the meeting of the Refrigeration Division of the National Electrical Manufacturers' Association held at the Wardman Park Hotel today.

Arthur J. Wood, president of the American Society of Refrigeration Engineers, was present as a guest, and presented a tentative plan for organized research into technical phases of refrigeration. He proposed that study of the properties of refrigerants be taken up early in the suggested program.

T. Vincent Butler, of the Copper and Brass Research Association, addressed the Division and offered the services of metallurgists connected with the Association for advice and consultation on all questions pertaining to the use of copper and brass.

Rice Products, Inc., Detroit, was announced as a new member of the N. E. M. A. Refrigeration Division.

A joint meeting was held with the appliance Division at which Earl Whiteborne, of McGraw-Hill Co., outlined a broad picture of the future possibilities of the electrical appliance business. He envisioned the time when new homes will be completely equipped with electrical labor-saving devices in the same way that the bathroom and heating equipment and hardware are now installed. He urged that the whole equipment be sold at one time instead of doing the job piecemeal as at present.

Those present at the Refrigeration Division meeting were: T. K. Quinn, H. W. Foulds, C. D. Taylor, T. E. Carpenter, E. T. Williams, L. P. Bannister, C. C. Spreen, F. M. Cockrell, E. S. Lape, W. W. Moss, Glen Muffly, A. J. Wood, T. Vincent Butler and E. W. Berresford.

The uniform warranty recommended to manufacturers reads as follows:

(1) Now, therefore, (name of manufacturer) guarantees that it will within (one) year from date of shipment from its factory, replace f. o. b. factory (name of city), free of charge, any part of said refrigerator equipment that was delivered mechanically defective, provided that all said parts shall be returned by the purchaser, transportation charges prepaid, to its factory at (name of city). Liability of seller shall be limited to the obligation to replace, free of charge, any parts proving defective at the time of delivery, and in case of failure to so replace defective parts, liability shall be limited to the cost of parts proving defective when delivered.

(2) No provisions of the above warranty to be in force when any part of the manufacturer's complete equipment is connected with another part not manufactured by the guarantor or not previously approved in writing by him.

(3) This guarantee shall be of no force or effect in case of purchaser's negligence or failure to operate said refrigerating equipment according to the manufacturer's directions.

FRIGIDAIRE ANNOUNCES PERSONNEL CHANGES

R. D. Van Dyke has been appointed manager of the Providence, R. I., Frigidaire branch. He was formerly zone manager. Mr. Van Dyke succeeds E. B. Dorsee, who has been transferred to the Baltimore, Md., branch.

W. C. Darmody has been transferred from the accounting department of the branches division to the position of office manager of the Baltimore branch.

EUROPEAN MANAGER

Baron Luigi Parrilli

European manager of Kelvinator Corp., with headquarters at Zurich, Switzerland, who is in Detroit with other representatives of the Kelvinator organization in Europe.

BARON PARRILLI SEES RAPID DEVELOPMENT OF EXPORT BUSINESS

European Food Legislation Aids Electric Refrigeration

Detroit, Oct. 19.—Key men in Kelvinator foreign operations are spending a fortnight or more in Detroit, making plans for 1930 business on the other side in consultation with R. A. Lindquist, manager of the export division, and other members of the company. The visiting representatives are Baron Luigi Parrilli, European manager; Eng. Roberto Parrilli, European service manager; Eng. Rudolph Geller, chief engineer of the Kelvinator distributor for Germany; B. H. Morash and Ralph Searle, of Kelvinator, Ltd., London, England; and Pierre Godquin, field engineer, just back from an extended tour of duty in many countries overseas.

Baron Luigi Parrilli, discussing business in Europe, says: "We came here to find September a national food preservation month. While much is being done along this line in the United States, Europe is also making great strides in legislation designed to protect the handling of food.

"Electric refrigeration has, until comparatively recently, been considered a luxury among Europeans. Now it is beginning to be considered as a necessity and people are commencing to take it as a matter of course. Commercially, electric refrigeration has made tremendous strides and it is now deemed a necessity. The butcher needs it as much as he does his knives.

"The governments of Europe are beginning to recognize this industry and are formulating legislation requiring higher standards in the handling of foods.

"We inherited the ice cream business from the States. This business is growing amazingly with us. Within the past two years many new ice cream concerns have started aggressive distribution Naturally this is bringing a broader market for ice cream cabinets.

"As an indication of the character of Kelvinator business in Europe, it may be interesting to know that we have recently installed a Kelvinator in the palace, which is now occupied, in Bucharest, Rumania, by Queen Elizabeth of Greece. Another recent installation was two large model Kelvinators in the castle at Coburg of Grand Duke Coburg-Gotha, brother-in-law of the King of Bulgaria. To show the changing trends and the improvement in European living standards, all of our installations are not made in palaces and castles. We are beginning to place Kelvinators in the homes of the workingmen. Quite recently, we made a multiple installation in a large apartment dwelling, occupied exclusively by working people in Germany."

ELECTRIC MACHINES CHIEF INTEREST OF ICE CREAM MAKERS

Users of Solid Carbon Dioxide Attracting Attention

REFRIGERATION equipment is again expected to dominate the Dairy Industries Exposition, which will be held under the auspices of the Dairy and Ice Cream Machinery Association at the Royal Coliseum, Toronto, Ontario, Canada, during the week of October 21 to 26. This will be the fourth annual exposition, the third having been held last year in Cleveland.

Other related events scheduled for the same week in Toronto will be the twenty-ninth annual convention of the International Association of Ice Cream Manufacturers, to be held at the King Edward Hotel, October 21 to 23, and the twenty-second annual convention of the International Association of Milk Dealers, to be held at the Royal York Hotel, October 24 to 26.

Uppermost in the minds of ice cream men is the problem of educating the American public to eat more ice cream. All available arguments and authority in support of ice cream as a healthful and nourishing food are being used to develop the market. Mechanical refrigeration is now recognized as essential equipment for the maintenance of the product while in the hands of the dealer, as well as in the processes of production. Solid carbon dioxide is now being studied in terms of its possibilities for maintaining the product during the process of delivery from store to customer. The widespread use of electric refrigeration is being capitalized upon as a means of preserving ice cream in the home.

Frozen fruits, which have been attracting much attention lately, are also being considered by the ice cream industry as a supplementary product for dealers. Enthusiasts are looking forward to the time when ice cream, frozen fruits, and frozen fruit juices will be delivered daily on regular routes in the same manner that milk is now distributed.

Electrically refrigerated ice cream cabinets, which are now made by nu-

(Continued on Page 8)

SALES SUPERVISORS' FOR FRIGIDAIRE NORTHERN DIVISION MEET IN DAYTON

Dayton, Ohio. — Northern Division sales supervisors of Frigidaire Corp. concluded a two-day session here with a banquet October 5. The session was held in order that plans might be completed for a last quarter driver to top Frigidaire's achievement of an eight months' record-breaking sale.

H. D. Wehrley, northern regional manager, told the 100 or more field supervisors who attended that over 100,000 more household Frigidaires were purchased during the first eight months of 1929 than during the same period of 1928.

Special plans for fall and winter selling were considered, and in addition to these general sessions, group discussions were held.

Speakers at the banquet included: J. A. Harlan, sales manager; R. L. Lee, head of sales education department; H. F. Lehman, installation and service manager; C. E. Adams, manager, Frigidaire division, G. M. A. C.; H. A. Malcolm, general manager for Chicago distributor; F. F. Williams, J. B. Nahstoll, J. C. Chambers, H. D. Van Dyke, C. W. Hamilton, D. E. Anderson, R. L. Winegardner, H. A. Parkett, L. W. Curl, R. J. Richards, F. L. Hazen, B. M. Markus, A. J. Warner, G. R. Nauman, E. H. Hackman and J. J. Nance.

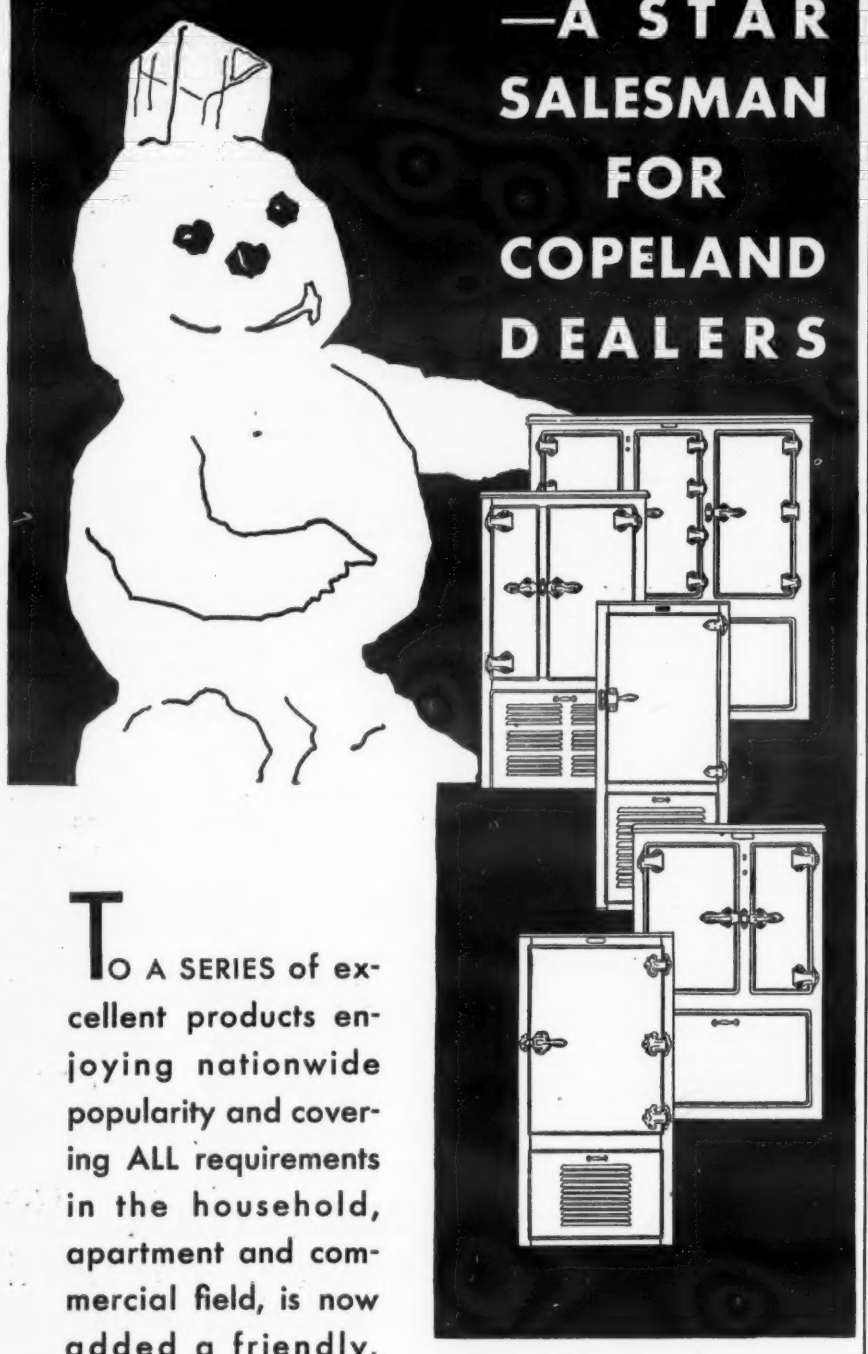
G. E. AUGMENTS STAFF OF UTILITY DIVISION

H. W. Kumler, J. M. Walker and C. J. Enderle have been added to the staff of the General Electric Central Station Division, Electric Refrigeration Department. Mr. Kumler has had nine years of refrigeration experience. Mr. Walker has been associated with utility companies for a number of years, and Mr. Enderle has been promoted. He was formerly secretary to T. K. Quinn, general manager of the Electric Refrigeration Department of the General Electric Co.

FRIGIDAIRE MEN GATHER AT BIRMINGHAM

Birmingham, Ala.—H. C. Jamerson, assistant sales manager; J. B Reeves, regional sales manager; and R. L. Lee, sales promotion manager, of Frigidaire Corp., Dayton, Ohio, attended the eleventh anniversary convention of the Domestic Electric Co., Sept. 6. Dealers from all parts of Alabama, Florida and Mississippi were present. One of the events of the convention was the opening of a new showroom at 403 N. Twentieth St.

THE COPELAND SNOWMAN —A STAR SALESMAN FOR COPELAND DEALERS



TO A SERIES of excellent products enjoying nationwide popularity and covering ALL requirements in the household, apartment and commercial field, is now added a friendly, whimsical, interesting "star salesman."

It is the Copeland Snowman, personifying the attributes of Copeland Dependable Electric Refrigeration and gaining favor with the householder by offering to "guard your baby . . . crisp your salads . . . make your desserts . . . cool your drinks . . . keep your kitchen tidy . . . add to the joy of living," etc.

Interest in the Copeland franchise has been heightened since the "birth" of the Copeland Snowman and his official adoption as an integral part of the Copeland trade-mark; distributors and dealers handling Copeland are now destined to move even more rapidly along the highroad to prosperity.

COPELAND SALES CO., 630 LYCASTE AVE., DETROIT

Copeland

DEPENDABLE ELECTRIC REFRIGERATION

"FOR THOSE WHO WANT THE FINEST"

DEALERS IN SOUTH NEW JERSEY RESORT CENTERS REPORT INCREASED SALES

By R. A. Malony

THE resort cities along the famous south Jersey coast have just completed the best summer season of their existence. Hotels have been filled to capacity, many buildings are under construction, and business in general has been good. It is expected that a large number of people will visit these resorts throughout the rest of the year, as the climate is especially mild during the winter months.

Distributors and dealers in electric refrigerators in these resort cities report the most prosperous year of their business history. This is especially true in the "World's Playground," Atlantic City. Famed as the "Convention City," electric refrigeration has been making rapid progress in caring for the food preservation needs of the many visitors.

The Frigidaire Sales Corp., 3538 Atlantic Ave., Atlantic City, has a list of customers that includes many of the city's well known landmarks. They have installed water coolers in the new Convention Hall, used for the first time for the N. E. L. A. Convention, as well as the Steel Pier and the Million Dollar Pier. Among installations in public buildings are the million dollar Atlantic City High School, Ventnor City High School, Atlantic City Hall, Ventnor City Hall, Atlantic City Hospital, Masonic Temple, County Court House at May's Landing, State Police Barracks at Absecon, Pine Rest Hospital and the Detension Home.

Frank Walsh, Inc., Kelvinator distributor in Atlantic City, has been active in caring for the refrigeration needs of florists. Two model installations of Kelvinators were made in the Atlantic City Flower Shop and the George Berk Flower Shop.

The Eastern Hardware & Supply Co., 933 Atlantic City Ave., General Electric refrigerator distributors for this section, report a record business. The Reynolds Co., Ventnor General Electric dealers, have just installed 52 units in the luxurious new Oxford Apartments on the ocean front.

To the south of Atlantic City another resort has been steadily gaining popularity—Ocean City. The dealers here are unanimous in reporting the best refrigeration year to date. J. H. Becotte, manager, Standard Electric Supply Co., Welsbach dealers, declared that many of his sales this year were made from leads obtained by making periodic visits to his existing customers. In addition to obtaining these leads, he has succeeded in keeping his service calls down to a minimum.

Raymond H. Perks, Copeland dealer, reports exceptionally good business in the short time he has been handling the Copeland line.

Wildwood and Cape May, lying along the extreme southern end of the New Jersey coast, have also enjoyed a most prosperous year. The Goslin Lumber Co., Frigidaire dealers, located at Schellenger and Hollybeach Avenues, in Wildwood, has made greater sales to date in 1929 than obtained in the whole previous two years. They have also installed many commercial units; among them was a meat market installation in the Morris Hunt store, where the customer reports a $50 per month saving in the five months time that the job has been in operation.

BIRMINGHAM SALESMEN ARE VYING FOR PRIZES IN ELECTROLUX CONTEST

Birmingham, Ala.—A unique Electrolux sales contest is now on between the salesmen of the Birmingham Gas Co. The men are divided into two teams, "Ammonias" and "Hydrogens," and they are competing for a side bet of fifty dollars and a dinner for the winning team. Both teams are pledged to sell 455 Electrolux refrigerators during the duration of the contest.

A. W. Grossman, district sales manager, has offered twenty-five dollars in prizes to the individual salesmen who exceed their quota.

GENERAL REFRIGERATION COMPANY MOVES KANSAS CITY OFFICE

Kansas City, Mo.—The General Refrigeration Co., manufacturers of Lipman refrigerating systems, has moved its branch office and salesroom to 1931 Main St., under a three-year lease. The former office of the branch was located at 805 Delaware.

A. C. Harford is manager of the Kansas City branch, which covers territory in northern half of Kansas and part of southern half, western half of Missouri, and the two Kansas Cities.

A branch line railroad at the rear of the building facilitates the handling of refrigerator shipments.

WORKS MANAGER

Edward Hughes

Edward Hughes, nationally known as an aviation construction engineer, has been appointed works manager of Copeland Products, Inc., Detroit, President Louis Ruthenburg announces.

Mr. Hughes goes to the Copeland plant from the Heywood Starter Corp., manufacturers of motor starting equipment for airplanes, of which he was general manager.

Previously he was with the Aircraft Development Corp., Detroit, where as construction manager he supervised the erection of the Grosse Ile airport hangar, the Ford airport mooring mast, at that time the largest in the world, and until his resignation to go with Heywood, supervised construction work on the recently completed ZMC-2, the first all-metal dirigible. He also designed and supervised the erection of the U. S. army mooring tower at Scott Field, Belleville, Ill., the first completely enclosed mooring mast ever built. Previously for six years he was with the Delco Division of General Motors Corp.

ONE SALE PER DAY FOR 154 DAYS!

One Frigidaire sale per day for 154 consecutive selling days is the record claimed by John Tarr, salesman for the Kansas Gas and Electric Co. of Wichita, Kan. Mr. Tarr is a salesman in the town of Independence, Kan., which has a population of approximately 11,000 people.

VENEMAM ACCEPTS POST WITH PURDUE UNIVERSITY

H. G. Veneman has been appointed head of Refrigeration Department at Purdue University, Lafayette, Ind. Mr. Veneman has resigned his post as sales engineer of the Frick Co.

Mr. Veneman received his B. S. in mechanical engineering at the University of Colorado, and after graduation taught there a year. He then entered Harvard and specialized in refrigeration, making exhaustive tests on absorption machines.

From 1910 to 1917 he worked for the Des Moines Ice & Cold Storage Co., rising to the position of chief engineer. He left and became sales manager of the Baker Ice Machine Co., Omaha, Neb. In the early part of this year he resigned and became connected with the Frick Company.

ALABAMA G. E. MEN ATTEND FALL MEETING

General Electric refrigerator dealers in the state of Alabama attended an "Open Winter" sales meeting held at Birmingham September 20, by Mathews Electric Supply Company, distributors. Among the General Electric representatives who spoke at the meeting were J. J. Donovan, manager of the apartment division; L. W. Driscoll, district representative, and A. R. Green, of the commercial division. Gordon Smith, vice-president of Mathews Electric Supply, was in charge of arrangements.

REFRIGERATION DIVISION OF PERFECTION STOVE CO. PLANS WINTER CAMPAIGN

Cleveland—Following up an effective direct mail and farm paper campaign last spring on the Superfex oil-burning refrigerator, the Perfection Stove Company, Cleveland, is planning to urge intensive winter selling effort on the part of their dealers, according to W. M. Barber, sales manager of the Refrigeration Division.

The farm market where electric current is not available, which the company considers its greatest field, Mr. Barber feels can be effectively reached during the lax winter months. "I do not see any reason," Mr. Barber said, "for the dealer pulling up a box of sawdust beside the stove for a winter of inactivity just because the farmer is taking a well earned rest before beginning another arduous season.

"While his mind is at ease and he has time to think about the plan for the coming season, it is an excellent time for the dealer to introduce new or improved products.

"Practically all of the company's refrigerator and milk chiller dealers are located in towns of 10,000 or less population. The majority of them are new, that is, not the same dealers who handle the company's cook stoves, water heaters, etc.

"Forty per cent of these dealers used and paid for the three-piece direct mail campaign last spring which was offered to them. Considering that this was the first time the company attempted to sell instead of give away its advertising literature, and that the refrigerator is still in its first year on the market, indicates a good future for oil-burning refrigeration equipment in markets where electric current is not available."

The milk chiller, called Superfex, will be exhibited at the Cow Show in St. Louis, October 12 to 19, and at the Dairy Industries Exposition in Toronto, October 21 to 26.

METHYL CHLORIDE HIT IN DECISION BY NEW ORLEANS COMMISSION

New Orleans, La.—The low bidder on the refrigeration plant for the new Criminal Courts Building here lost his opportunity to install his plant, while a higher bidder was awarded the contract, at an open meeting of the Commission Council on October 1.

The Council decided against the low bidder after James M. Todd, consulting engineer of the new Criminal Courts Building, declined to approve methyl chloride as a safety refrigerant, and did approve the higher bid for a plant using carbon dioxide.

The successful bidder was the Wittenmeier Machinery Co., of Chicago, which submitted a bid of $15,895, and an alternate bid of $14,895.

The Council conducted an open hearing on the safety merits of methyl chloride, ammonia and carbon dioxide. The United Iron Works had submitted a bid approximately $4,000 under any other bidder, on a plant to use methyl chloride.

H. H. McKinnies, representing that company, declared that the safety of methyl chloride cannot be questioned, and explained in detail that there is more air space in the building than safety would demand even if an accident should release the entire chemical charge. He explained further that automatic valves and vents to disperse the gas in the event of such accident is a routine part of the installation of methyl chloride refrigerating plants.

Attacking methyl chloride as poisonous, H. J. Kelly, representing the Wittenmeier company, said that carbon dioxide is the general choice for cooling theatres, adding that it is not inflammable.

Immediate exception was taken to this by Jerome W. Davis, sales manager for A. Baldwin and Co., Ltd., New Orleans. He said he had made frequent demonstrations before conventions at which he put methyl chloride on food and ate it, and also put it in water and drank it, without the slightest disagreeable effects.

Mr. Davis said there are at least 800 installations of methyl chloride refrigerating equipment in New Orleans alone.

Specifications originally prepared by the court house commission called for a carbon dioxide plant, members of the commission said, but bids were allowed on three different kinds of equipment after vigorous protest on the part of manufacturers of electric refrigerating plants.

LIQUID COOLER CORP. TAKES NEW QUARTERS

Detroit.—Liquid Cooler Corporation, manufacturers of Temp-Rite water coolers, has moved its factory and offices to a new location at 6527 Russell St., Detroit, Mich. Rapid increase in sales made necessary an expansion in manufacturing facilities.

CABINETS BY

Seeger

SAINT PAUL

PRESTIGE

The Pre-eminence of Cabinets by Seeger Saint Paul, including both Residence and Commercial Lines, has not come over night—it has been a matter of slow, conscientious progress over a period of years, the working out of a worthy ideal conceived twenty-five years ago, a sound foundation upon which Seeger reputation and prestige has been built, and is being maintained.

The essential modern factors, practicability, durability and beauty are incorporated in all Cabinets by Seeger, and they are scientifically constructed to assure maximum perfect food preservation with positive minimum maintenance expenditure. Compact convenience, effortless cleanability, Seeger Chiltray and Vegetable Bin are additional noteworthy features of importance, and the result of diligent research in Seeger Laboratories.

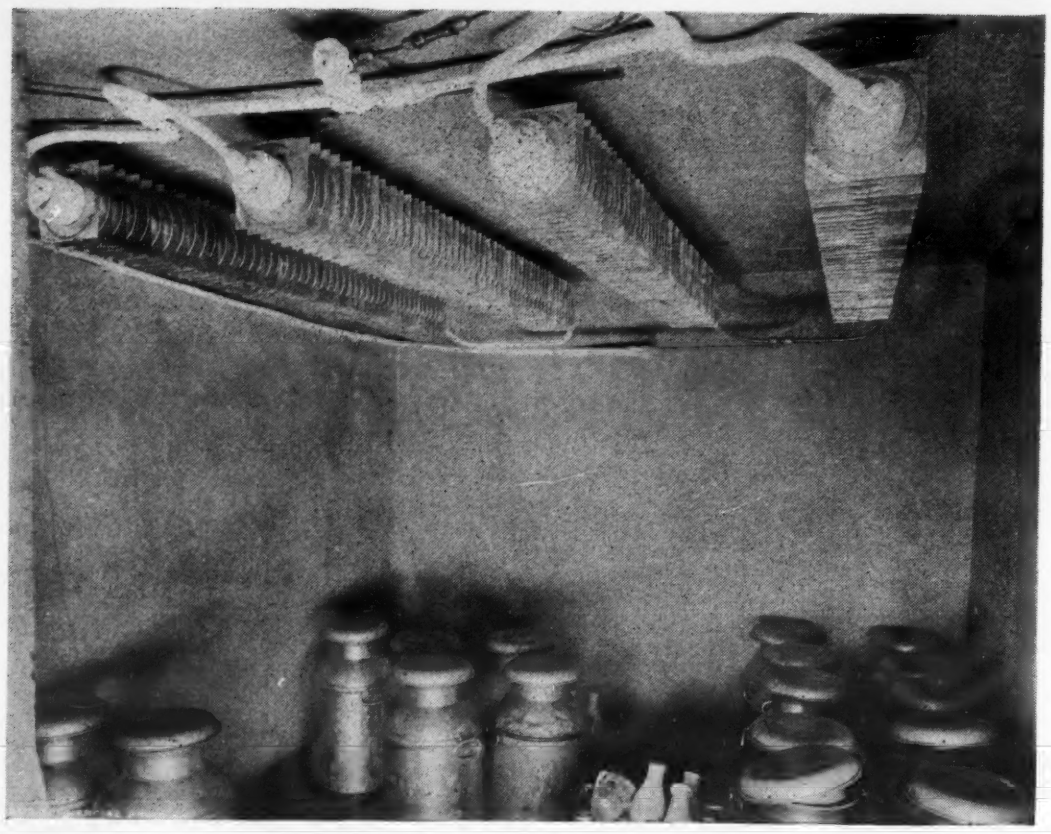
Cabinets by Seeger Saint Paul, recognized by authorities the world over as the outstanding Refrigeration Cabinets, are distinctly modern in each and every detail, and only quality materials are utilized in their manufacture. Flawless porcelain produced in the Seeger plant, adequate insulation of pure cork board sealed, endorsed by refrigeration engineers as the best insulation known, removable shelves correctly placed, position of doors, interior arrangements, massive construction, modern chromium plated hardware, experienced workmanship and continuous conscientious supervision are the organized dominating forces which result in the supremacy of Cabinets by Seeger, and make them outstanding.

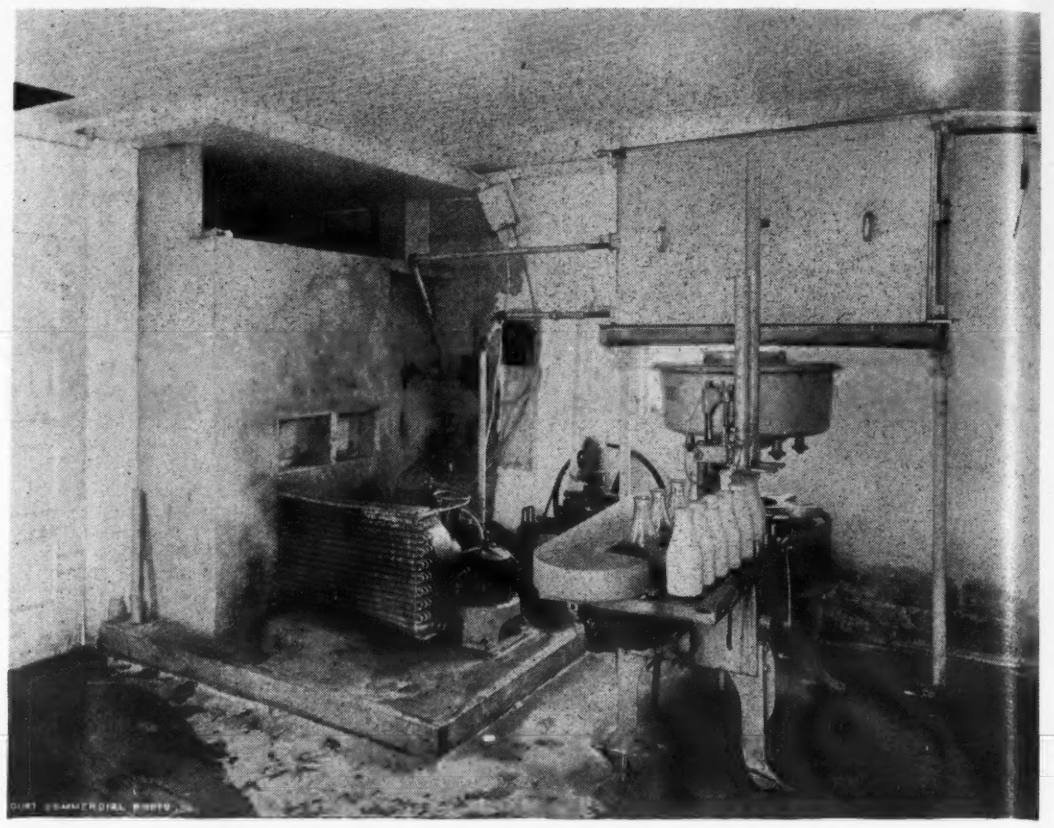
This combination of quality materials, conscientious workmanship, scientific engineering and the intricate placing or assembling of one part to the other are what constitute Cabinets by Seeger, making them as good a Cabinet as it is possible to make, for use with Electrical or Gas Refrigeration.

SEEGER REFRIGERATOR COMPANY

SAINT PAUL, MINNESOTA

ELECTRIC REFRIGERATION MAKING BIG STRIDES IN *Copeland Equipment Installed in Long Island Dairy*





AN interesting electric refrigeration dairy installation is that recently completed by Robert W. Plyer, Inc., Hempstead, L. I., Copeland distributors, in the Dahl Dairy at Hempstead. This dairy handles 300 gallons of milk in cans and bottles daily.

A Copeland Model A condensing unit with three 3Z flooded coils was attached to a 500-gallon brine tank, consisting of interior and exterior of concrete separated by 4-inch cork insulation. The Model XA condensing unit for the aerator was used instead of a Copeland Model X because of insufficient water pressure for condensing purposes. A Model X handles the milk storage room together with four 8-foot zero tubes. The brine is kept at a temperature of around 10°F. and circulated in the lower section of the aerator.

No baffles were used because the storage room roof was low, and hanging them under the zero tubes would prevent the stacking up of the milk crates.

The installation has attracted much attention from other Long Island dairy companies, Mr. Player reports, and several similar installations already have been contracted for.

LIPMAN

ELECTRIC REFRIGERATION

» » » LIPMAN says it with SALES!

When a buyer exchanges money for a refrigerating machine, he merely turns a current asset into a fixed asset. His net worth remains the same.

But—and here is the vital point—his profit and loss statement undergoes a change. A cheap machine, with its greater depreciation, higher operating cost, and larger maintenance cost, is a drag on net profits.

On the other hand, a Lipman machine, representing probably a slightly larger investment, conserves net profits . . . because its "cost of ownership"—meaning depreciation, plus operating expense, plus service expense—is lower.

The lower cost of owning a Lipman soon offsets the difference in the purchase price. From then on, it's "velvet." No wonder "Lipman says it with sales" . . . for no matter how "price-minded" a prospective purchaser may be, he can always be made to see value where value actually exists. The Lipman offers the sweetest selling story ever told on commercial electric refrigeration.

A few desirable territories are still open to qualified distributors. Write, wire, or phone today for full information. No obligation. All correspondence held strictly confidential. Address the General Refrigeration Company, Beloit, Wisconsin.

A SIZE FOR EVERY COMMERCIAL PURPOSE

Lipman
ELECTRIC REFRIGERATION

SELLING REFRIGERATION TO VERMONT DAIRYMEN

By C. K. Jones

NOTE: Mr. Jones is on the sales staff of G. S. Blodgett Co., Kelvinator dealers at Burlington, Vt. During the early part of this year he sold nineteen milk-cooling units within a few weeks.

ALTHOUGH Vermont is a dairy state of no little importance in relation to the milk supply of metropolitan Boston and New York, there are but few, if any, real large dairies throughout the state. The average Vermont farmer is a typical Yankee, slow to invest in any improvement until its value has been definitely established and the economies of such an investment proved for his own particular needs. Also, there are a great many who are not financially able to carry the installation cost of any electric refrigeration equipment, a circumstance which was greatly increased by the state-wide flood damage of less than two years. And, furthermore, there are countless dairies in the state which are miles from their nearest electric power line.

Competition in many forms make every interview interesting. That an inexpensive ice harvest can be easily obtained is not less an obstacle than the still used abundant supply of cold running spring water.

However, in every locality it has been my attempt to interest and sell the largest producer first. He is generally looked up to by his neighbor, and his selection is usually accepted as best by them, and as consistent with his greater success in their business. I, too, have learned from experience that the dairyman possesses his share of natural envy. If his neighbor buys something, he hopes and strives to obtain an article equally as good, or better. Following one of my first sales, I called upon our customer's neighbor. He soon exhausted his excuses and finally suggested my selling our equipment to his neighbor. On being told that I had already done so, his attitude changed and his interest to own a similar but larger outfit was evidenced. Before leaving he showed his dairy equipment and buildings to me and did not forget to call to my attention many things which his neighbor did not have.

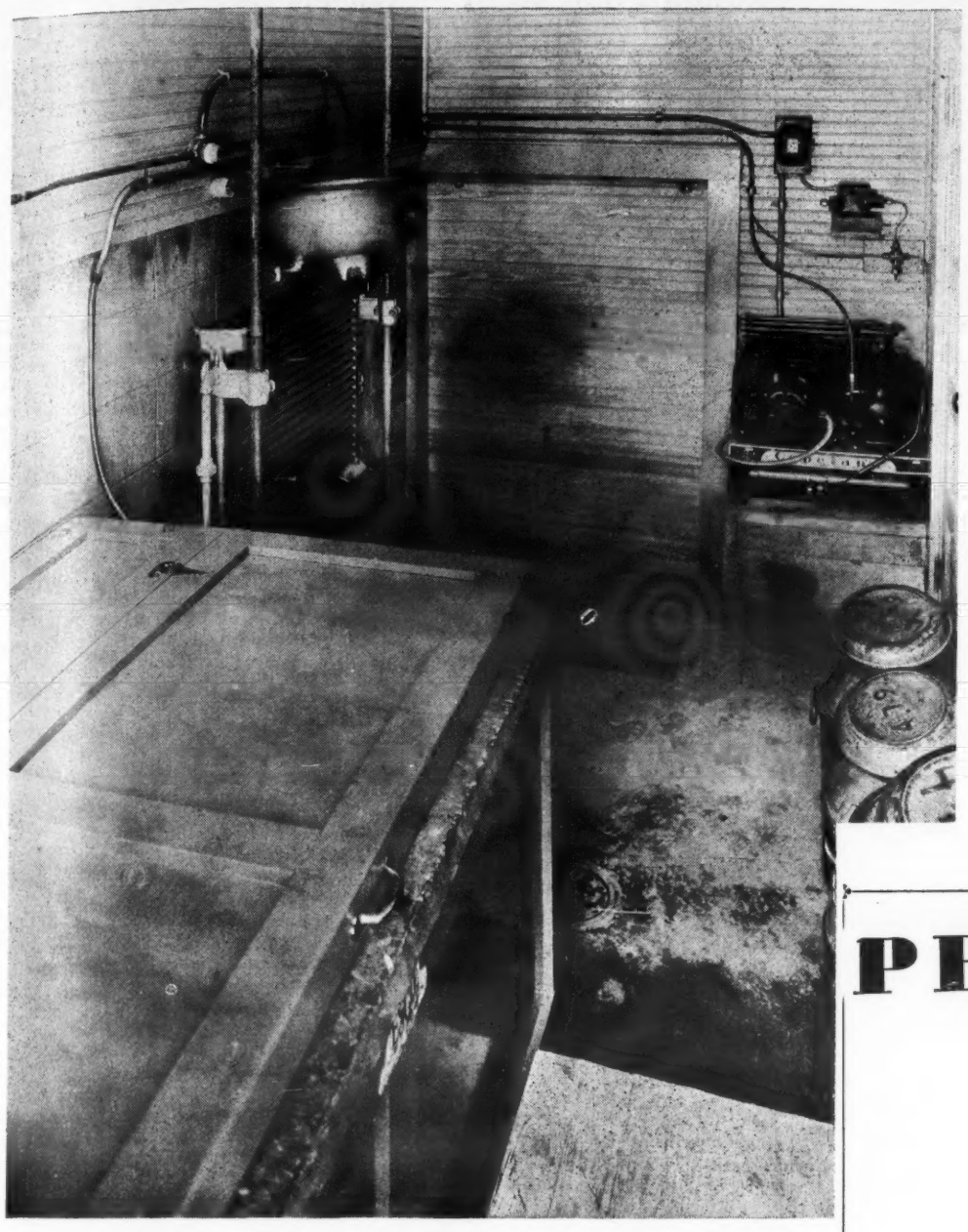
For the milk dealer who delivers his production in milk bottles and these bottles in regular milk crates, I have worked out a combined areator system and dry cold air storage that has been most satisfactory in operation. As there is no standard cooler for this purpose, I have recommended a good carpenter-made four-inch cork insulated cooler with a raised slatted floor. The cold air produced by brine tanks follows down through sealed cold air, drops to the floor up through the slats, and through the wire bottoms of the crates and around the bottled milk. The brine tanks also are connected to areator by circulating pump for prechilling.

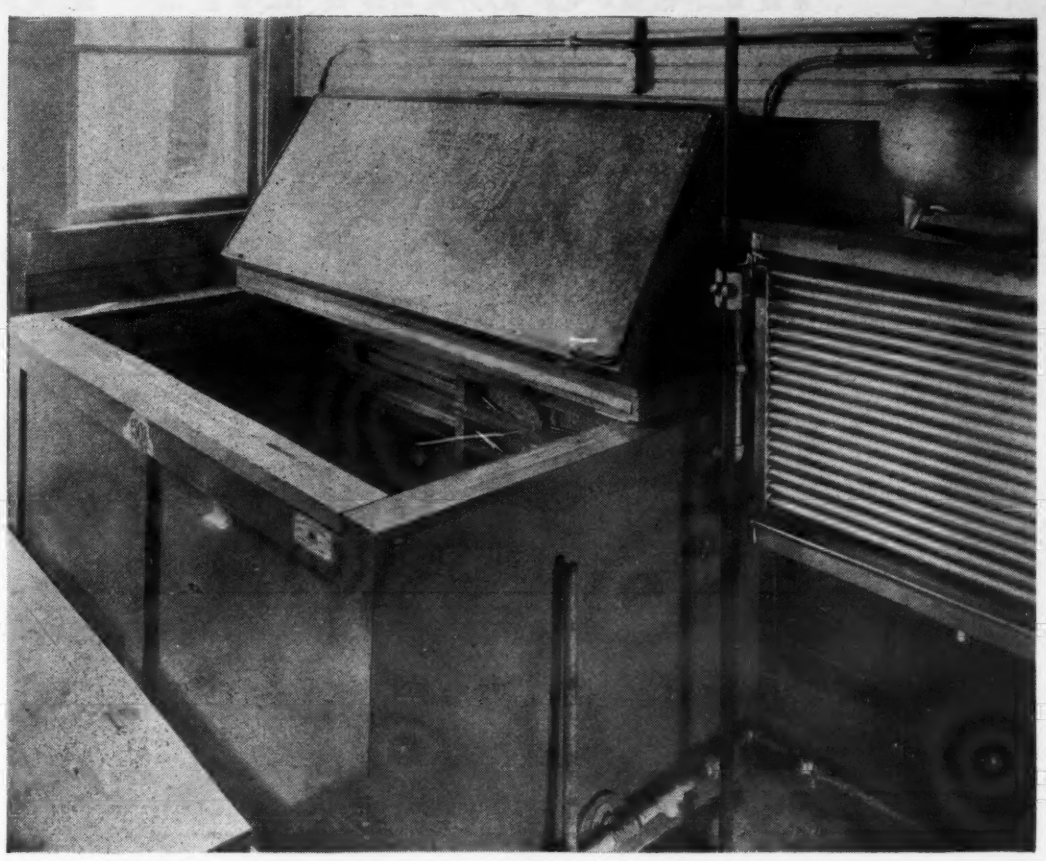
HARTFORD DISTRIBUTOR AWARDS PRIZES

Hartford, Conn.—Newton-Parsons Co., distributors of General Electric refrigerators here, recently held a contest and at a dinner October 4 awarded prizes to salesmen selling the most units. Gustave Zurcher, East Glastonbury, Conn., was awarded first prize of $25 in gold. Arthur J. Cressey, Windsor, received second prize of $15, and Frank J. Galvin a third prize of $10. Eversharp pencils in colors of blue and gold were distributed to the guests.

MEETING NEEDS OF DAIRY AND ICE CREAM FIELDS

And Model Farm of Guernsey Association Leader





COPELAND electric refrigeration equipment for milk cooling has been installed on a model farm near Syracuse, N. Y., for Thomas Monroe, president of the New York State Guernsey Breeders' Association. The installation was made by B. I. Cooper Sales Co., Inc., Syracuse, distributors for Copeland Products, Inc., who previously had sold Mr. Monroe a DeLuxe Eight Model Copeland for his home.

The equipment consists of a Model R Copeland condensing unit and an E8 Esco Cabinet-Aerator. The cabinet has a capacity of 8 milk cans. Coils circle the interior to increase efficiency and dependable operation. The aerator is connected to the cooler so as to maintain brine water temperature at 40 degrees, and to rapidly cool the milk which is held at that level until delivery time; this makes it possible to deliver it to the consumer under the 50-degree danger mark.

The rapidly increasing demand in Mr. Monroe's section for better grades of milk has resulted in premiums being paid in his territory for milk with a low bacteria count.

DAIRY REFRIGERATION NETS PROFIT TO FARMER

Figures have just been compiled by E. G. Stahl, agricultural power specialist of the San Joaquin Light & Power Corp., Fresno, Calif., which show the high yields which dairy electrification gives the farmer.

At a complete cost of $1,500 the farmer can install a refrigerating plant, which will use $130 worth of electricity annually. His depreciation and interest for the year will be $300. On a 30-cow dairy, the increased value of the milk would be $607.60, leaving the farmer a clear profit of $177.50 on his refrigerating plant alone.

These figures have been checked and rechecked by the San Joaquin utility, and they have instructed their salesmen to use them in their sales talks with dairy men. The increase in the value of the milk is obtained by raising the milk from factory milk at sixty cents per pound butterfat, to grade A market milk at eighty-one cents per pound butterfat.

OFFERS LINE OF ICE CREAM ADVERTISING SPECIALTIES

The Parisian Novelty Co., Chicago, Ill., offers a line of advertising specialties for the ice cream industry. These include novelties for children, washable back bar signs, and menu covers.

ELECTRIC REFRIGERATION INCREASES PROFITS FOR CALIFORNIA CREAMERY CO.

George Smith, proprietor of the Crystal Creamery, San Jose, Calif., states that electric refrigeration has been a dominant factor in the increase of his profits over a two-year period.

During the years 1924 and 1925, when the creamery was without electric units, it produced, approximately, twice as much ice cream as it did in 1927 and 1928, the years it introduced and operated units. The net profit of the firm, on the wholesale side of its business, was much greater the last two years, with the 1924 and 1925 production cut in half, than it was during those first years.

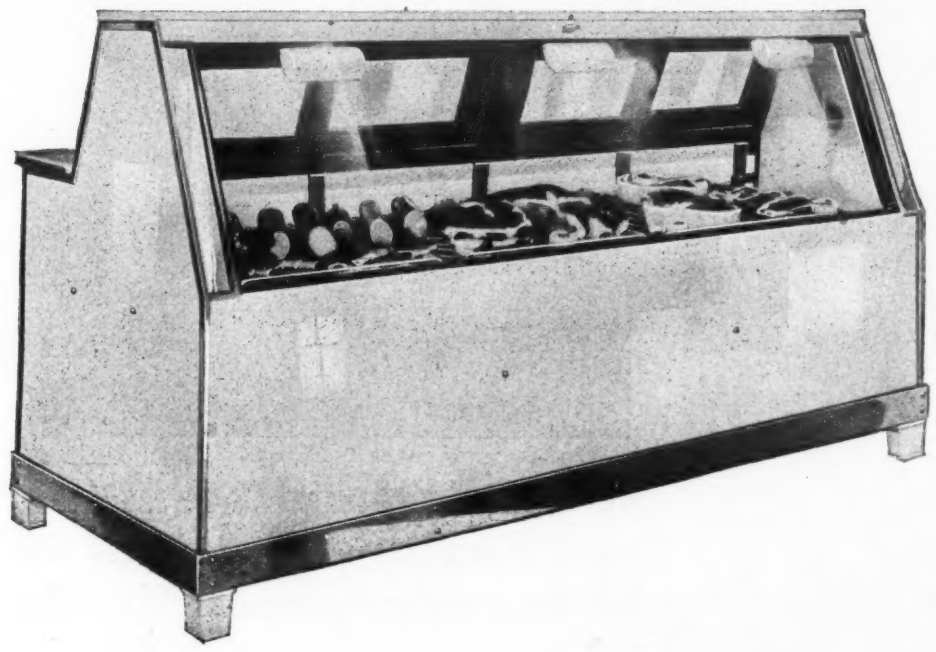
The introduction of refrigeration into Crystal Creamery distributing points cut the number of service and repack trucks from three to one, eliminating the cost of two cars, with their upkeep and drivers.

This firm has recently purchased a 3-hole Gold Nugget Kelvinator from the Hot "n" Kold Shop of San Jose, Cal.

W. A. TADLOCK NOW WITH GEORGIA POWER CO.

Atlanta, Ga.—W. A. Tadlock has joined the Georgia Power Co. as refrigeration engineer for outside districts.

PROGRESSIVE *food shops*



Monel Metal trimmed display counter manufactured by the SEEGER REFRIGERATOR COMPANY, St. Paul, Minn.

want *Monel Metal's* gleaming surfaces

THE modern progressive food shop is inviting... bright, clean, spick and span... because up-to-date retailers are adopting methods and materials that make food products easier to sell.

Monel Metal trimmed refrigerator display cases are playing their part in increasing food shop profits. They build larger sales because they look so well they invite patronage. They cut down maintenance costs because they are so easily kept clean and attractive. The final result is a net gain to the store owner or operator.

Monel Metal has been chosen for the trim of the most popular cases because it combines in the one material all of the most desirable service properties. It cannot rust, being an alloy of Nickel and copper. It resists corrosion. It is practically dent and scar-proof, having the strength and toughness of steel.

Monel Metal is readily available in the desired commercial forms — all the shapes and sizes required for economical refrigerator production. Use Monel Metal for your next installation. Write direct for additional facts.

5 million circulation

National magazines carrying Monel Metal color advertising reach nearly 5,000,000 families every month. Among these readers are hundreds of thousands of retailers who are prospective buyers of Monel Metal trimmed display cases and ice cream cabinets.

SEND FOR "LIST B" OF MONEL METAL AND NICKEL LITERATURE

Monel Metal is a technically controlled Nickel-Copper alloy of high Nickel content. It is mined, smelted, refined, rolled and marketed solely by The International Nickel Company, Inc. The name "Monel Metal" is a registered trade mar...

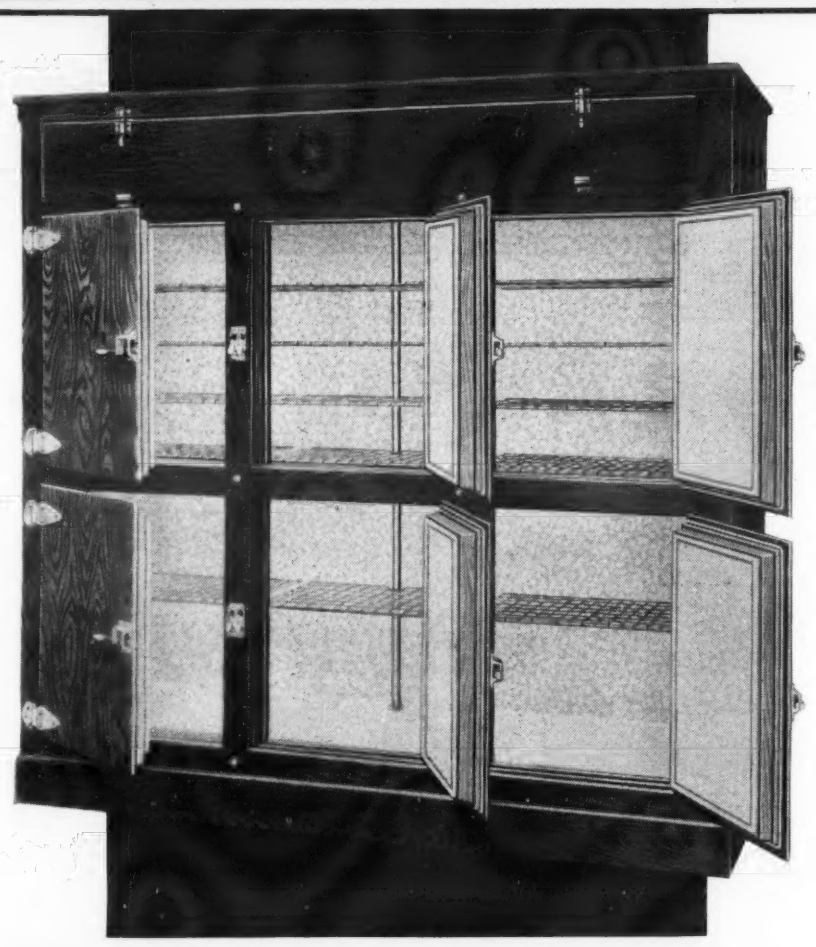
INCO MONEL METAL

MONEL METAL

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

HEADQUARTERS FOR

ELECTRIC REFRIGERATOR CABINETS



Special Manufacturing and Engineering Skill to Meet your Special Needs

Cabinets that assure utmost performance of electric units

The particular requirements of electric-unit manufacturers, distributors and dealers are cared for in the Leonard Special Contract Department. Here in the world's largest refrigerator cabinet plant we maintain a complete engineering staff, with every facility and resource for research, design and production. Custom-built cabinets for unit manufacturers. Cabinets for all types of mechanical units. A full line of sizes and styles for homes, apartments, stores, hotels and hospitals.

Let Leonard Commercial Cabinets help you sell more Commercial Installations, as they have helped many other dealers.

Leonard leadership, won through 47 years' cabinet building experience, is your assurance of quality and dependability. Write us for suggestions and quotations.

Leonard Refrigerator Company
Grand Rapids, Mich.

Furniture Mart, Chicago 1 Park Ave., New York

LEONARD CABINETS

50° CAMPAIGN

FOOD PRESERVATION PROGRAM HELPED BY BROOKLYN EDISON CO.

Brooklyn—In co-operation with the National Food Preservation Program, the Brooklyn Edison Co., Inc., put on special food preservation demonstrations throughout the month of September. The program opened with a big meeting in the Pearl Street office on September 12 with the subject of "The Buffet Supper for the New Home Warming, Stressing Refrigerator Recipes." Miss Jeanne Adaire, of the Frigidaire Corporation, was the speaker in charge of this meeting. Lectures on the following subjects were given:

"What to expect from and how to use an electric refrigerator."

"Enjoying to the fullest the electric refrigerator."

"Some Simple desserts."

"An apple a day in a variety of ways."

Demonstrations of salad making, ice cream freezing in trays and sparklet syphons, the making of fruit juice drinks with frozen punch cubes were given at these meetings, and refrigerated refreshments were served at the conclusion of each meeting.

ADVERTISING IS SHOWING WAY TO BETTER HEALTH

THE greatest health movement in all history steadily gathers momentum. Magazines and newspapers are discussing health questions as never before. They announce new clinics and systems of examining school children. They stir up popular interest in reducing the high cost of medical service to the great middle class. Their advertising of foods, clothing, refrigerators, and even office chairs, has a great amount of sound health suggestions along with considerable hokum. This advertising isn't so much disease prevention talk, but rather it stimulates interest in better-than-ordinary health. — *Advertising & Selling.*

SAYS PUBLIC UTILITIES DO NOT NEGLECT FARMERS

C. S. Ruffner, president, in his speech at the annual convention of the Empire State Gas and Electric Association, which was held at Upper Saranac, N. Y., on September 19 and 20, 1929, refuted the statements which had been previously made by Governor Frank D. Roosevelt, of New York. The Governor had stated that the public utilities were neglecting the farmer.

"New York State now ranks second only to California in the number of farms served with electricity," declared Mr. Ruffner. "This branch of our business which holds such tremendous possibilities in load building has shown very substantial progress in the last three years." In order to meet the problems involved in further extending service, Mr. Ruffner pointed out the necessity of developing more aggressive sales efforts and of reconstructing and modernizing rate structures.

BALTIMORE GAS & ELECTRIC OPENS NEW DISPLAY ROOM

Baltimore, Md.—Consolidated Gas & Electric Co. opened a new electric appliance display room which occupies the entire floor of the Lexington Building, corner Liberty and Lexington Avenues. The building is located in the heart of the shopping district and can easily be reached from all parts of the city.

Kelvinators will occupy a large portion of the floor and window space. Formerly, the refrigerators were located on the third floor of the building.

Demonstrations will be constantly given to keep up the interest of the shopping public and to get them into the habit of dropping in to see the newest developments in electrical devices.

WHEELER CORP. EXHIBITS AT ROCHESTER SHOW

Rochester, N. Y.—The Wheeler Refrigerator Corp. exhibited at the annual Rochester Exposition and Horse Show, which was held here the week of September 2. Over 100,000 people were in attendance at the fair, most of them from the surrounding rural sections. The exhibit was under the supervision of J. B. Deer, retail sales manager.

The Wheeler Corp. has equipped the new Stromberg-Carlson Telephone & Radio Manufacturing plant with eighteen 3 G. E. water coolers.

LEONARD ORGANIZES INSTITUTE TO STUDY FOOD PRESERVATION

Grand Rapids, Mich.—As a memorial C. H. Leonard, who aided development of household refrigeration to its present high standards, the Leonard Institute of Food Preservation is to be established here, according to a recent announcement by A. H. Jaeger, secretary and sales manager of the Leonard Refrigerator Company. The Leonard Company was founded in 1882 by C. H. Leonard, and with which he was actively associated until his death in 1927.

The founding of the Institute, according to Mr. Jaeger, should be of vital interest to retailers of refrigerators, for it marks the commencement of research work and public education in refrigeration that will have wide influence in breaking down sales resistance and increasing refrigerator sales. He declared that the work of the institute will be largely in investigations and research in various fields of food preservation, including refrigeration, with a view to cutting down the tremendous losses sustained in America each year through food spoilage. These researches will be carried on in conjunction with recognized public agencies and state universities, and the results of the findings will be placed before the public from time to time.

"Although remarkable advances in household refrigeration have been made in recent years," said Mr. Jaeger, "millions upon millions of dollars' worth of food products are being lost annually because of the lack of observance of simple refrigeration principles. The average housewife knows more about the car in her garage than about the refrigerator in her kitchen. The Institute will seek out new facts on food preservation and pass them on to the public. Special attention will be given to those aspects of the subject which look toward safeguarding the family health and to the economies that may be achieved through proper refrigeration. We plan to make the Institute a national clearing house of information on all matters pretaining in any way to household food preservation."

SEEGER SURVEY SHOWS PROPER SIZE CABINET TO BE USED IN HOMES

Seeger Refrigerator Co., St. Paul, Minn., has just completed a most interesting investigation on the important question: "What Size Cabinet Do You Recommend for Homes of Various Values?"

For some time the old yard-stick of from 2 to 2½ cubic feet of refrigeration, per person in the family, was misleading in the fact that this, which should be the minimum, was mostly used as a maximum, and for the speculative builder there was nothing to be used as a guide, as he, of course, does not know how many persons will live in the house he is building or expects to build.

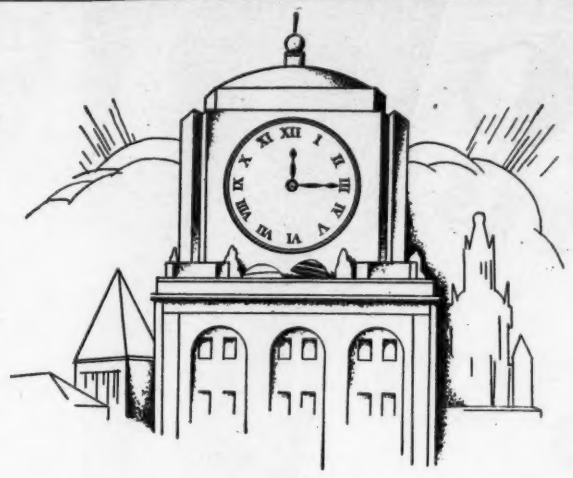
The factor of entertaining which is supposed to enter now, is certainly relative to the value of the home, as it is quite apparent that what the person living in a $5,000 home would call entertaining, would not be called that by one living in a home valued at $20,000 and over. Further, it is a difficult question to handle, as no matter how much or how little a family may entertain, the wife insists that they do very little, if any, while the husband is equally insistent that they are entertaining all the time.

While these are the reasons for the investigation, the dealers, architects and builders questioned knew nothing of them, so the Seeger Co. was able to get an, unbiased opinion, based entirely on facts. A great deal of interest was shown by all those receiving the questionnaire, and nearly every one of the eight hundred and fifty-one replies requested that they be informed of the results of the investigation. The figures shown are the recommendation of the majority.

Value of Home	Cu. Ft. of Refrigeration
$ 5,000.00	5
8,000.00	6
10,000.00	7
12,000.00	7
15,000.00	9
20,000.00	9
25,000.00	12
50,000.00	17X
60,000.00	20X
75,000.00	40X
100,000.00	50XX

X Recommended two cabinets — one for kitchen and one for pantry.

XX Recommended three cabinets.



EVERY 15 MINUTES

during April, May, June and July

an ELECTROLUX WAS SOLD *in Metropolitan New York*

PHOTO BY EWING GALLOWAY

A tiny gas flame takes the place of all moving parts

LOOK at that statement again for a moment. Every 15 minutes! For 4 months! In New York! You'll say that sounds incredible . . . but here are the figures.

Noiseless Electrolux refrigerators went into 5,535 kitchens of modern homes in metropolitan New York during the months of April and May. Two months only, mind you.

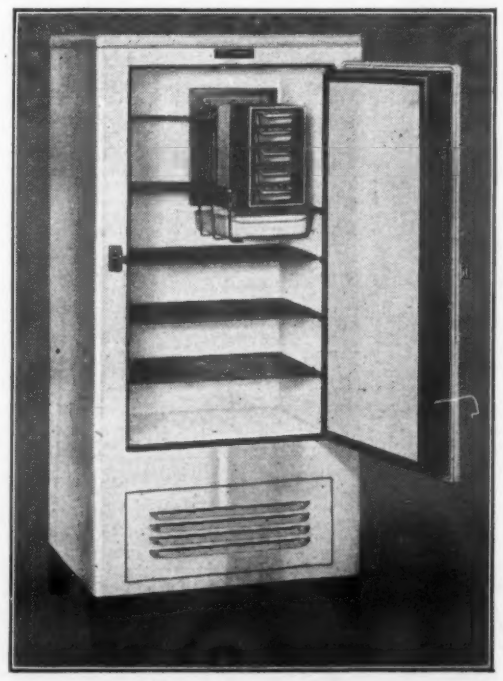
For the 4 months of April, May, June and July, Electrolux sales climbed to a grand total of 11,471 units, practically one sale every 15 minutes. And this in New York . . . the market that sales managers the country over term the most indifferent and skeptical to a new product.

But additional figures for New York, over varied periods of time, are just as amazing. In nine short months, 20,859 Gas Refrigerator sales were made! During the last 12 months nearly 27,000 silent, economical Electrolux units have been sold. And that's in only one area. In Philadelphia there are proportionate figures. Chicago swings to Electrolux as the safest and most convenient system of refrigeration. In Washington, Texas, California, New England . . . Electrolux is making great strides ahead.

Widespread national advertising and publicity in the Saturday Evening Post . . . in Good Housekeeping . . . in newspapers . . . is telling the public all over the nation about the many advantages of Electrolux . . . features possessed by no other refrigerating system. People are talking about it. And a lot of those people are right in your own territory . . . prospects for Electrolux.

Turn your prospects into customers by keeping in constant touch with them. Interview builders and architects. Get your share of the fast increasing Electrolux business. The market is unlimited. Succeed with Electrolux, the Gas Refrigerator. Write for any information, merchandising and sales helps, to Servel Sales, Inc., Evansville, Indiana.

THE REFRIGERATOR THAT CAPTURED NEW YORK! Absolute noiselessness, lowest operating cost have made Electrolux the fastest-selling automatic refrigerator in America's largest city. Hostess model shown.



PROUD OF HER ELECTROLUX? You just bet she is. Recent survey in Brooklyn shows that 100 Electrolux owners out of 100 asked had urged neighbors and friends to buy the noiseless GAS refrigerator.

ELECTROLUX THE *Gas* REFRIGERATOR

DRY·ZERO INSULATED CABINETS OFFER YOU 5 DISTINCT SELLING ADVANTAGES!

POINT NO. 5

Dry-Zero insulated refrigerators have many features of outstanding merit—yet they *cost no more.* Foremost manufacturers, distributors and dealers have been quick to see and acknowledge that refrigerators insulated with Dry-Zero assure improved operation of the unit.

Of all known commercial insulants Dry-Zero has the greatest heat resistance (U. S. Bureau of Standards.) Your refrigerating unit is highly efficient; it deserves the most efficient cabinet insulation, especially when no additional cost is required.

To your customer Dry-Zero insulated cabinets represent a saving. The reduction in running time means less wear and tear on the machine . . . . fewer repairs. The combination of efficiency in unit and insulation spells economy—a strong selling point.

Dry-Zero has a natural aversion to moisture*. Ask your manufacturer for Dry-Zero insulated cabinets. They *cost no more* . . . . they help you sell!

Since the running time of the machine, the wear of its parts and the efficiency of the entire refrigerator depends largely upon cabinet insulation, the authoritative proof of Dry-Zero's greater resistance to heat, shown in this chart, is important to the entire industry.

Comparative Values

established by U. S. Bureau of Standards, Armour Institute, State Universities and other impartial authorities.

Material	Wt. cu. ft.	Insulation Value	Absorption*
DRY-ZERO	2 lbs.	4.15 to 4.3	14
Corkboard	9.5 to 13 lbs.	2.9 to 3.3	28
Wood fibre board	13 lbs.	2.9 to 3.2	115
Flax fibre board	13 lbs.	3 to 3.2	66
Cane fibre board	15 lbs.	2.7 to 2.9	78
Mineral wool slab	17 lbs.	2.6 to 2.8	

*Test run by University of Minnesota.

DRY-ZERO CORPORATION
130 N. Wells Street Chicago, Illinois

*The Dry-Zero fibre, CEIBA, is standard in U. S. and other Navy life jackets.

Keep them on your finger-tips! They help you sell!

DRY·ZERO

KELVINATOR 1930 SALES PROGRAM PRESENTED AT DISTRIBUTORS' MEETING

(*Concluded from Page 1*)

Advertising and sales promotion plans for the coming year are being presented at this convention. A visit to the Kelvinator plant on Plymouth Road is scheduled for today. The complete program follows:

Tuesday Morning, October 8
Little Theatre, 22 Columbia Avenue
Welcome—H. W. Burritt, vice-president.
Address—G. W. Mason, president.
Address—J. S. Sayre, sales manager.
Selling Talk—V. C. Woodcox, domestic sales manager.

Tuesday Afternoon
J. S. Sayre, sales manager, presiding
Introduction of Kelvinator district managers.
Commercial Possibilities—J. M. Fernald, commercial sales manager.
"Filling in the Valley," a play in two acts, to illustrate commercial selling.
Service—E. A. Seibert, service manager.
"The Cure," a play on the wrong and the right way of service calls.
"Studies in Markets" (domestic), Godfrey Strelinger, manager of branches.
"Acceptance vs. Saturation"—J. S. Sayre, sales manager.
"Following Through," a play in three acts. Theme: Selling Kelvinator.

Wednesday Morning, October 9
Little Theatre, 22 Columbia Avenue
H. W. Burritt, vice-president, presiding
Introductory—Edward Heitman, chief engineer.
Engineering—C. C. Thomas, engineer.
Getting Them Right—G. M. Evans, general works manager.
Working for the Customer—G. V. Pollard, chief inspector.
Looking Ahead—W. B. Walker, purchasing agent.
About Orders—H. K. Lyons, manager order department.
Ice Cream Cabinets—H. A. Sieck, manager ice cream cabinet division.
Things Leonard Has For You—A. H. Jaeger, sales manager, Leonard.
Export—R. A. Lundquist, export manager.
Kelvinator Balance Sheet—H. A. Lewis, treasurer.
Credits and Collections—G. V. Egan, assistant secretary and treasurer.
Accounting Analysis—J. Timpy.
Finance—B. A. MacDonald, president, ReDisCo Corp.
ReDisCo—C. A. Armstrong, manager, ReDisCo Corp.
Planning For Profits—J. S. Sayre, sales manager.
Luncheon—Main Ball Room, Book-Cadillac Hotel.

Wednesday Afternoon
Main Ball Room, Book-Cadillac Hotel
Earl Lines, presiding
Policies and Plans for 1930—Earl Lines, director of advertising and sales promotion.
Address on Advertising—Arden Yinkey, vice-president MacManus, Inc.
Trade Journals and Commercial Approach—Charles J. Baker, MacManus, Inc.
Contests and Co-operation—J. S. Garceau, assistant manager, sales promotion.
A Film Service Regularly—L. E. Davidson, visual demonstration system.
Literature and Other Helps—M. E. Kirk, assistant manager.
Introducing the Editor of **Cold Facts**—George R. Cullen.
Introducing the Home Economics Department—Misses Sawyer and Chase.
National Showing Plans—Earl Lines.
Summing Up—H. W. Burritt, vice-president.
Visit to Kelvinator plant.

HOLMES OMAHA BRANCH IS TEMPORARILY CLOSED

Omaha, Nebr.—The W. & S. Refrigeration Co., here, selling agency of the Holmes refrigerator for several months past, has temporarily closed the Douglas street offices. All business is now transacted at 210 North Eighteenth Street, the service station.

CAMPAIGN SPECIALIST

A. A. H. Uhalt

An interesting development in the Electric Refrigeration Department of the General Electric Company is the Campaign Section.

This section is a branch of the Merchandising Service Department and will assist utilities in planning and conducting their refrigeration campaigns.

Heading this activity is A. A. H. Uhalt in the capacity of campaign specialist. Statistical data and information on successful campaigns will be accumulated and made available to other companies for use in their campaigns.

Valuable assistance has already been given to the Georgia Power Company and the Rochester Gas and Electric Company in conducting their million dollar campaigns on refrigerators.

INTEREST OF ICE CREAM MANUFACTURERS CENTERS ON ELECTRIC MACHINES

(*Concluded from Page 1*)

merous manufacturers, were practically the first commercial application of small units to receive wide acceptance. Keen competition among the manufacturers and the large size of the equipment orders placed by ice cream manufacturers have stimulated interest in the Dairy Industries Exposition. Displays of electric refrigeration units, ice cream cabinets and soda fountains have occupied the central position at the Exposition during past years.

Among the exhibitors at Toronto will be:

Allegheny Steel Co., American Thermos Bottle Co., Anheuser-Busch, Inc., Armstrong Cork & Insulation Co.

Bristol Co., Buffalo Foundry & Machine Co.

Central Alloy Steel Corp., Carbo-Freezer Co., Champion Line Machinery, Inc., Cherry-Burrell Co., Chester Dairy Supply Co., Consolidated Cabinet Corp., Cork Import Corp., Crane Co., Creamery Package Mfg. Co.

Dry Ice Corp. of America.

Frick Co., Frigidaire Corp., Fucoma Co., Inc.

General Electric Co., Grand Rapids Cabinet Co., Gueder, Paeschke & Frey.

Holderle Bros., Inc.

International Nickel Co.

Jensen Creamery Machinery Co.

E. A. Kaestner Co., Kelvinator Sales Corp.

Joe Lowe Co., Inc.

Manning Mfg. Co., Mayer Body Co.

C. Nelson Mfg. Co., No-Freeze Back Control Co.

Oakite Products, Inc.

Paterson Parchment Paper Co., Perfection Stove Co., Purity Paper Vessels Co.

Refrigerating Equipment Co., Russ Mfg. Co.

Sealright Co., Inc., Sethness Co., Sharples Separator Co.

Chas. J. Tagliabue Mfg. Co., Taylor Instrument Co., Tri-Clover Machine Co.

Universal Cooler Corp.

Valerius Corp., Vilter Mfg. Co., Victor Products Co.

Westinghouse Electric & Mfg. Co.

York Ice Machinery Corp.

Copeland Factory Employes Form Athletic Association

Left to right—H. O. Roberts, secretary; L. H. Beeks, treasurer; C. Clayton, vice-president, and L. W. Howe, president.

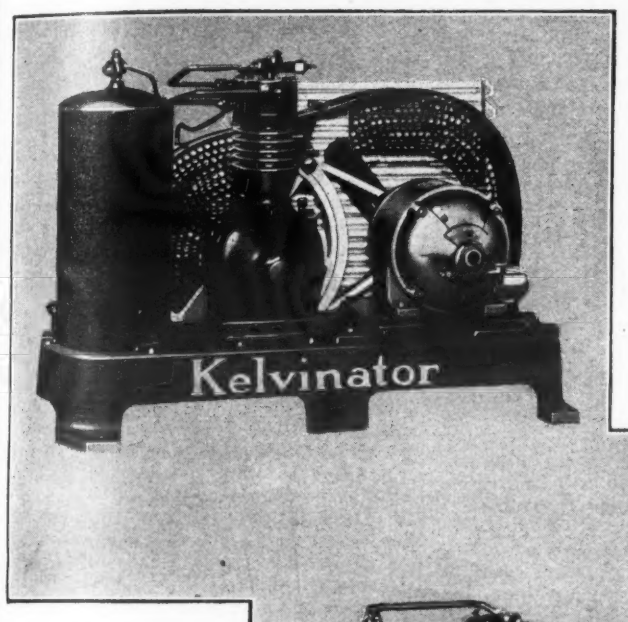
ORGANIZATION of an athletic association by Copeland Products, Inc., officials and employes has been completed. More than 90 per cent of the company's employes, representing all departments, already are members.

The organization will be known as the Copeland Athletic Association. Officials are: President, L. W. Howe; vice-president, C. Claytor; treasurer, L. H. Buhs; and secretary, H. O. Roberts. Committee chairmen are: Bowling, Ben Watkins; golf, Otto Lonskey; publicity, William S. Race; membership, Leo Farrell. Other committees are to be named. An advisory board representing the factory management consists of Carleton S. Smith, comptroller; Edward Hughes, factory manager; C. W. Haden, of the executive staff.

The association is already represented by a bowling league of eight six-men teams, competing weekly, and by six two-men trapshooting teams, who, under the direction of President Howe, will shoot on alternate Sundays. Golf and baseball activities will be postponed until next spring. A series of social entertainments is planned for the winter.

KELVINATOR

Again enlarges its commercial line to more accurately serve individual requirements of business



(At Left) Model R-10. ¾ H.P. Air-Cooled unit with refrigerant-cooled compressor head.

(At Right) Model WR-20. ¾ H.P. Water-Cooled unit with water-cooled compressor head.

STRENGTHENING its position of leadership in the field of commercial electric refrigeration, Kelvinator now rounds out its line with the production of two new heavy-duty refrigerating machines, four new cross-fin cooling units and two new water coolers.

The immediate result of these additions to the Kelvinator commercial line is to give Kelvinator dealers the most complete coverage in the industry for every type of commercial requirement.

With the two new condensing units, Kelvinator dealers will have available 15 separate condensing units, including 8 heavy-duty models specially designed to handle heavy refrigeration loads.

Kelvinator thus adds greater flexibility of application and adaptability in meeting every problem of commercial refrigeration, and provides a more accurate selection of units for given requirements. Heretofore there has never been so fine a subdivision of machines available for this purpose.

New Giant Cross-Fin Coils

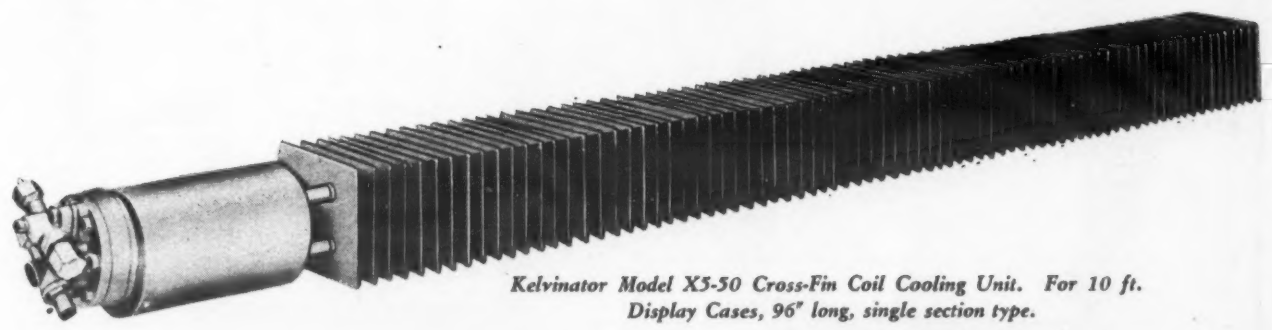
Keeping pace with the increased efficiency and capacity of its new heavy-duty machines, Kelvinator again offers an outstanding achievement in its new giant model cooling coils.

Model X5-140 is the first unit of its type that is of unit construction and will handle the average market cooler. Previous practice has required a minimum of two cooling coils to do this job. This giant model alone has a capacity equivalent to 105 tons of ice per year.

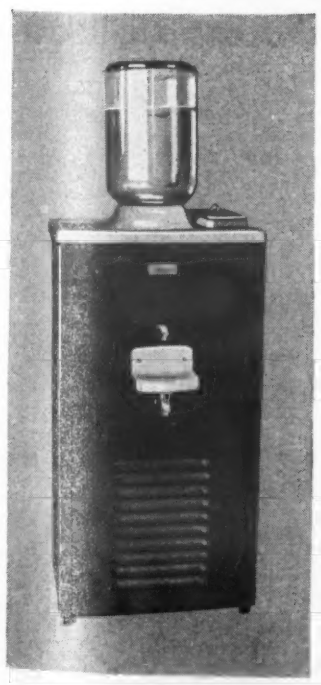
A Broader Avenue of Profits For Kelvinator Dealers

With Kelvinator's remarkably complete line of condensing units and cooling coils, plus the new Kelvinator water coolers for office and factory requirements, Kelvinator dealers have a year-round opportunity for sales and profits in the commercial field.

Upon application we will gladly forward descriptive matter on the new Kelvinator Heavy-Duty Line and the complete 1930 line of Kelvinator Commercial Refrigerating Equipment.

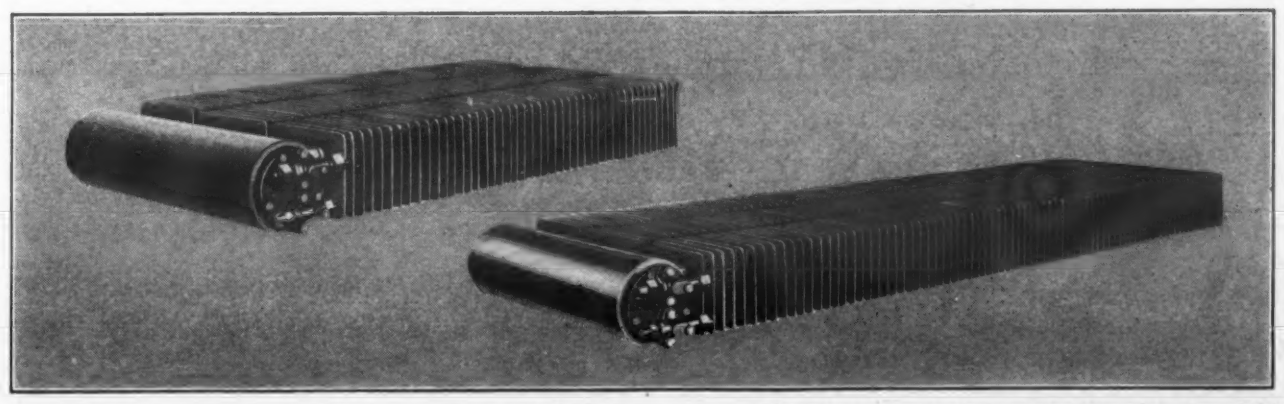


Kelvinator Model X5-50 Cross-Fin Coil Cooling Unit. For 10 ft. Display Cases, 96" long, single section type.



Kelvinator Model Y-10 Bottle-Type Water Cooler. Mechanical Unit in Base. Fitted with storage compartment for beverage bottles, lunches, etc.

Kelvinator Model Y-30 Pressure Type Water Cooler for connection to city water lines. Suitable for both office and factory. Also contains storage compartment for bottles, etc.



(Top) Kelvinator Giant Model X5-130 Cross-Fin Coil Cooling Unit. For large commercial refrigerators, 42" long, triple section type.

(Bottom) Kelvinator Giant Model X5-140 Cross-Fin Coil Cooling Unit. 66" long, triple section type. CAPACITY EQUIVALENT TO 105 TONS OF ICE PER YEAR.

KELVINATOR CORPORATION

DETROIT, MICHIGAN

Electric Cooling Solves Ice Cream Trucking Problem

MILK COOLING TESTS WITH BRITISH UNIT PROVE SATISFACTORY

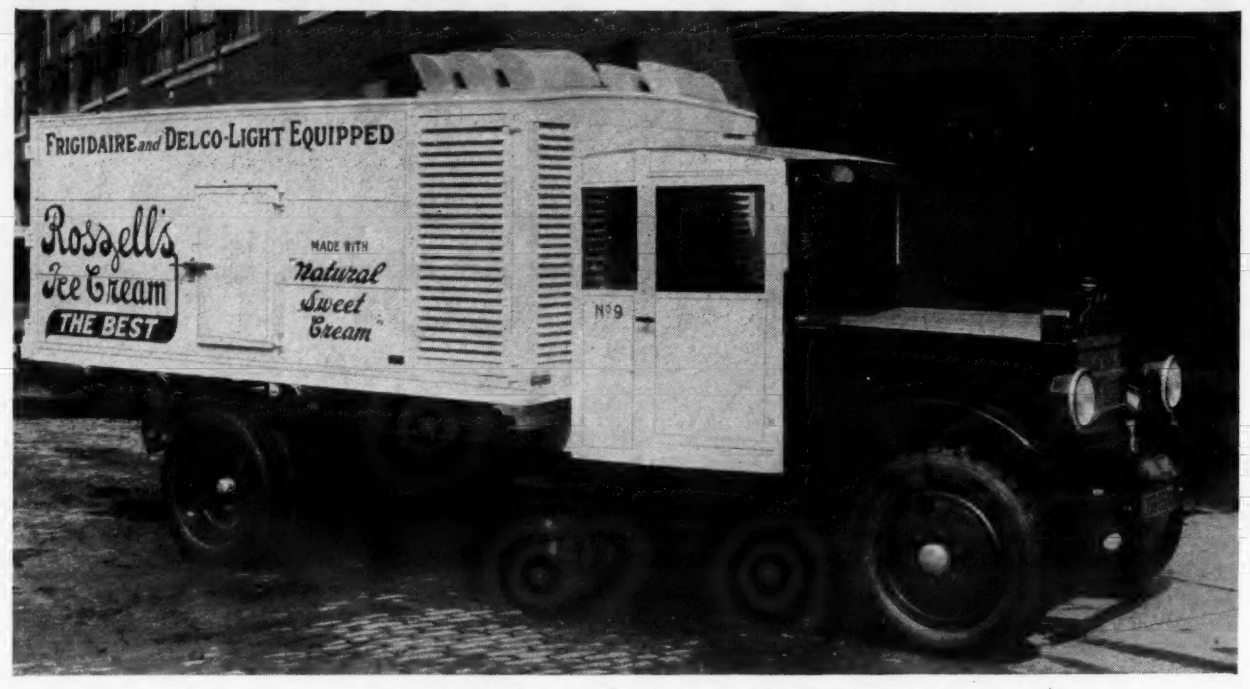
The question of cooling milk adequately has recently been dealt with by an article published in *Cold Storage and Produce Review*, London, England.

This article states that the Wessex Ethylor refrigerator, a British product, has lately been subjected to exhaustive milk cooling tests at the National Institute for Research in Dairying at Reading, England, and that it has performed favorably in all of them.

The Ethylor plant consists of a rotary compressor, a condenser and a cooler or aerator over which the milk flows. The top half of the aerator contains running water, which cools the milk to about 6 degrees above its own temperature. The bottom half of the aerator contains ethyl-chloride gas, and after the milk flows over this it is reduced to 36°-38° Fahrenheit.

Compactness is a salient point of the Ethylor outfit. The smallest plant, which has a capacity of 17 gallons of milk per hour, has an overall length of 3 ft. 7 in., and an overall width of 1 ft. 4 in. The largest plant has a capacity of 220 gallons of milk per hour, and has an overall length of 8 ft. 10 in., and an overall width of 2 ft. 5½ in. The driving power required varies from ½ h. p. to 5 h. p.

The plant is sold by Wessex Refrigerating Plants, Ltd., Wells, Somerset, England.



Meyer Truck Body Equipped with Frigidaire Unit

Meyer Body Company, Inc., 214-220 Elm St., Buffalo, N. Y., offers electrically refrigerated ice cream motor truck bodies adaptable for 2 and 2½ ton chassis.

These bodies contain three compartments: the compartment in front running across the body, contains, on the left side, the generator system for generating the current, consisting of gas engine, generator and battery starter. The condenser coils, automatic temperature regulator, compressor, and motor for driving compressor are on the right side of the body in the same compartment. The machine has an air cooled condenser.

A self-contained Frigidaire unit is used, operating entirely independent of the other truck mechanisms, thus permitting refrigeration to be maintained in any place at any time. There is an automatic self-starter with battery to start the gas engine. Louvered or ventilated doors are on the right and left side of the front compartment.

The second compartment, which is heavily insulated, has a width of 68 inches, length of 80 inches, height of 44 inches, with additional coil height of 25 inches. Carrying capacity is 385 gallons of ice cream. The third compartment has a depth of 22 inches and is used to carry empty cans.

Bodies can be bolted to the chassis without disturbing the inside linings or insulation.

REFRIGERATION FOR FARMERS WITHOUT ELECTRICAL SERVICE

ONE of the newer and a unique type of milk chilling device that will be exhibited at the Dairy Industries Exposition this year for the first time is an oil-burning milk chiller. It is designed especially for the use of the dairy farmer and it reduces the temperature of milk to less than 50 degrees within a few minutes of the time the milk is drawn from the cow.

Manufacture of this new type of milk chiller recently was begun by the Perfection Stove Company, Cleveland, Ohio, makers of the Superfex oil-burning household refrigerator. It uses the same type of apparatus as their household refrigerator.

Operating on the absorption principle, the Superfex milk chiller stores in a chilling cylinder the refrigeration generated by the heat of kerosene used in burners like those on oil stoves.

When the milk is to be chilled it is poured from the milk pails into a receiving tank on top of the device, from which it flows by gravity, first over an aerator through which cold water is circulated, and from the aerator to the chilling cylinder, where the temperature is reduced to as low as 40 degrees, if desired, at the rate of a gallon in two to three minutes. From the chilling cylinder the milk flows directly into the shipping can.

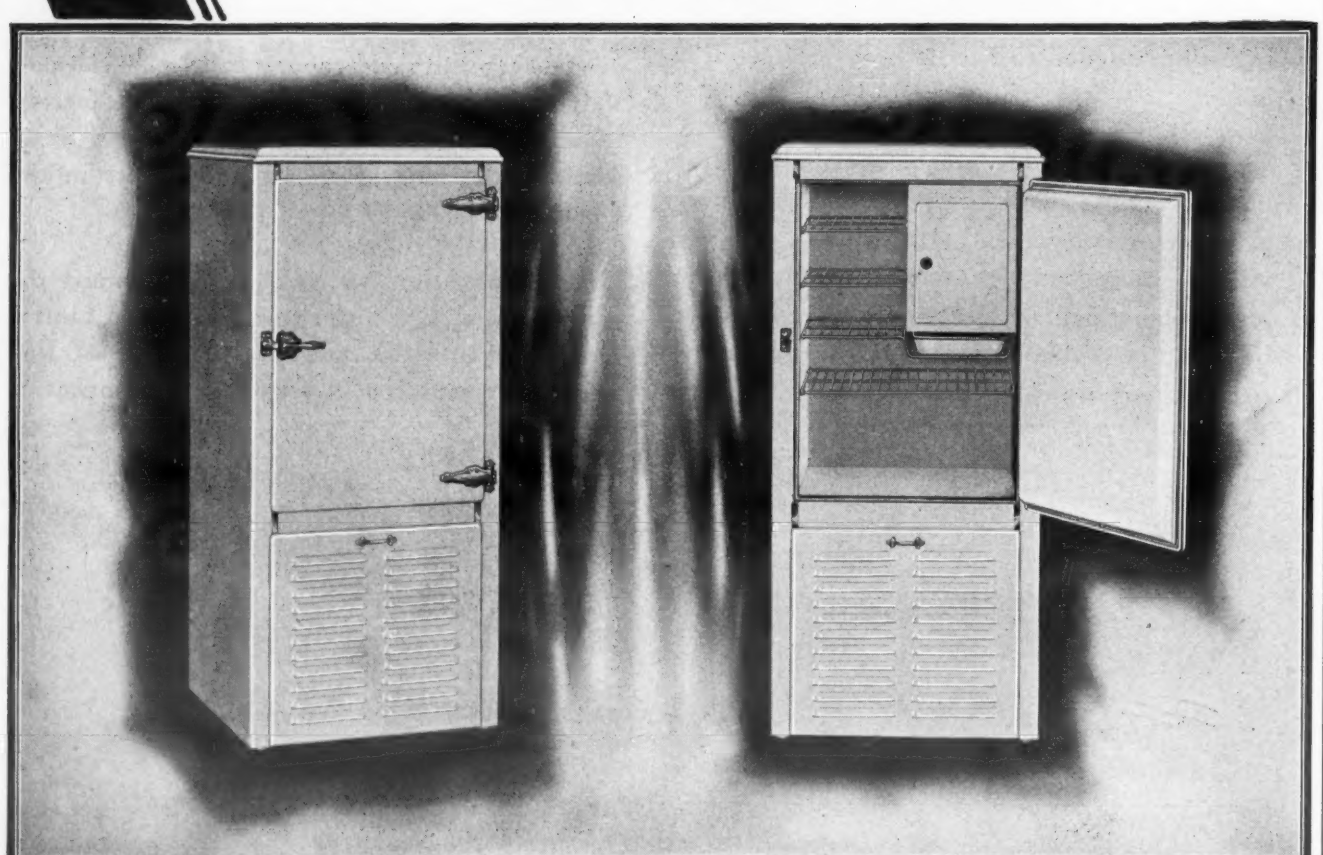
The quantity of milk that can be chilled depends upon the rate at which it is permitted to flow over the aerator and chilling cylinder, and is also dependent upon the temperature of the water that is circulated through the aerator.

Slightly over a quart of kerosene is required for the generation of refrigeration for the chilling of the milk at each milking time, and this generates sufficient refrigeration to chill 30 gallons of milk from the temperature at which it comes from the cow to 40 degrees when water of approximately 55 degrees is circulated through the aerator and the milk is permitted to flow at the rate of a gallon in two to three minutes. If the water is 70 degrees, approximately 18 gallons of milk can be chilled to 40 degrees at the same rate of flow. Where slightly higher temperatures is satisfactory, larger quantities of milk can be chilled by speeding the flow; for instance, with 55 degree water circulated in the aerator, 70 gallons can be chilled to 50 degrees at the rate of one gallon a minute.

In practical use, refrigeration is generated in the oil-burning milk chiller immediately after each milking, and an insulated jacket is slipped over the chilling cylinder, retaining the refrigeration for use at the next milking time.

The cost of chilling milk with this device under average conditions is said to be approximately one cent for each 10 gallons of milk that is chilled.

ANOTHER REX TRIUMPH



A New All Porcelain Rex Cabinet

In answer to a growing demand from our customers Rex now offers a one door all porcelain cabinet of five cubic feet net capacity at a very attractive price. Besides the porcelain finish, this model, which is known as the Rex P50, has full crown top, deluxe hardware, and other new features. Quantity production of this new model has enabled us to make the price surprisingly low. Wire or write for full specifications and net prices.

Your copy of the new leaflet illustrating and describing this new model is now ready for mailing. May we send it?

REX MANUFACTURING CO.
CONNERSVILLE ▲ INDIANA

ICE FREEZING CAPACITY INCLUDED IN NEW ESCO MILK COOLING PLANT

A milk cooling cabinet, which supplies ice for delivery purposes, is being manufactured by Esco Cabinet Co., West Chester, Pa.

This cabinet and ice-maker is adaptable to any standard electric refrigerating unit. The exterior of the cabinet is made of 26 gauge rust resisting Armco iron, while the inside is lined with 22 gauge Armco iron.

Four models of Esco cabinets—B-65, B-100, B-150, and B-250—are manufactured with the following respective maximum cooling capacities in quart bottles per 24 hours: 130, 200, 300, and 500. The storage capacities in quart bottles for the cabinets range from 65, 100, 150 to 250, while the ice making capacities in pounds per 24 hours are 50, 75, 100 and 150.

ADDITIONS TO 1930 LINE MADE BY NELSON MFG. CO.

Nelson Mfg. Co., St. Louis, Mo., has made four additions to its 1930 line of equipment. They are: combined aerator and refrigerated cabinet for dairy farms, submarine bottle dispenser, restaurant cabinet providing ice water, ice and food storage, and a new luncheonette fountain.

The milk cooler has storage capacity for 8 to 10 gallon cans of milk and is equipped with a Nelson T3 twin cylinder 1/3 lip. compressor. Exterior panels are metal over wood and sheet cork insulation is used throughout the cabinet. This unit is equipped with a high speed aerator, which is cooled by brine.

The submarine bottle dispenser accommodates 110 small size bottles and has a bottle rack for storage purposes. The submarine holds the bottles in an upright position in a basket, which is immersed and lifted out of the ice water by a foot treadle, which also automatically opens and closes a sliding lid. This arrangement expedites the selection of bottles, which can be removed without delving into the ice water. This dispenser is insulated with sheet cork. The outer case is covered with black baked enamel panels, while the top is made of monel metal.

The fountainette equipment, which has overall dimensions of 85″ x 30″ x 31″, includes a Formica serving shelf, 3 syrup jars equipped with pumps, 2 fruit jars, twin faucet for hot and cold city water, sink with overflow, 3-way draft arm with combination glass rest and drip pan and a disher vat. One square and three round ice cream compartments have a capacity of 5 gallons each. The bottle storage compartment is 21½″ x 24″ x 21″, equipped with drain shelf and hinged lid, opening 12″ x 14″. This fountainette uses a self-contained 1/3 h. p. Nelson compressor unit.

The restaurant cabinet, 72-M, dimensions 72″ x 22″ x 38″, has a food storage space of 43″ x 14½″ x 22″ and is divided into an upper and lower section, each section being 43″ x 14½″ x 11″. The model provides storage for two 5-gallon cans, storage space for foods and bottled goods.

NAGLE LINE OF MILK COOLERS ANNOUNCED

Nagle Sheet Metal Works, Herkimer, N. Y., announces a line of submerged type Standard and Whirlpool milk coolers. Seven models with lengths ranging from 36 inches to 153 inches are offered. The width and depth of the coolers are 44 inches and 34 inches, respectively.

The coolers are made of 20-gauge Toncan copper iron insulated with three inches of corkboard and hydrolene paper. Wirfs gaskets are used on all covers. A sleeve is placed across the front of the coolers so that the compressor can be mounted on either the right or the left side of the cooler. Corner posts, bottom and end rails are made of hard wood, reinforced with galvanized iron. All models are finished in Brewster green lacquer enamel, and have two or more covers.

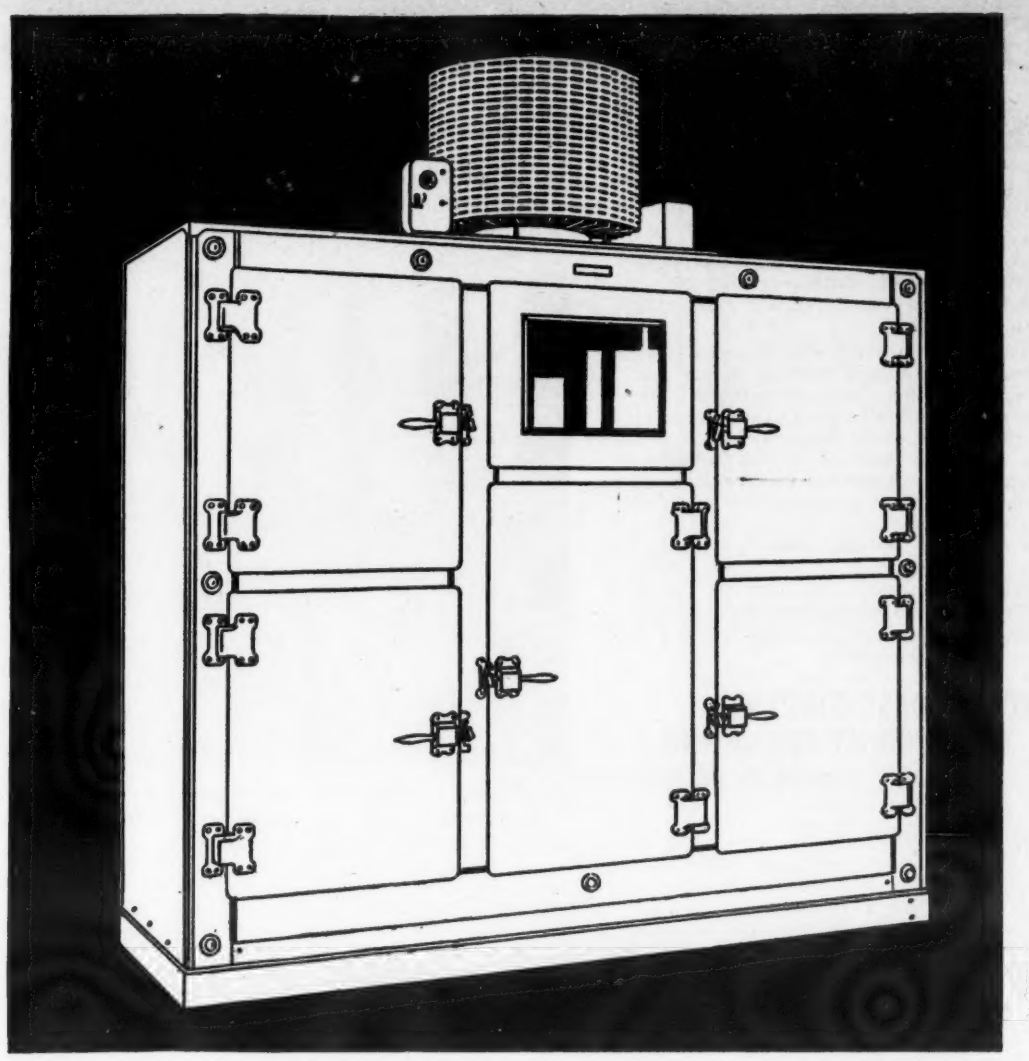
The Whirlpool cooler utilizes a small agitator, which consists of a ⅛ h. p. motor mounted in an aluminum bracket. This agitator has a small blade that is connected to the end of the motor. This blade, in rotating at a high speed, circulates water around the submerged cans of milk.

PORTABLE ICE BREAKERS MADE BY NEW YORK CO.

Ice breakers, portable and stationary, are now manufactured by Champion Line Machinery, Inc., 128 West 31st St., New York, N. Y., for the use of druggists, confectioners, restaurants and hotels.

The capacities of Champion ice breakers vary from a half to sixty tons per hour, and they can be had in either hand-power, belt or motor drive.

NEW NOW



MODEL C-450 has an all porcelain interior—food storage capacity 45 cubic feet. Shelves adjustable to 2 in. spacing. Exterior of cabinet, 79¾ in. wide, 30 in. deep, 72 in. high.

GENERAL ELECTRIC COMMERCIAL REFRIGERATORS

The General Electric Bottle Water Cooler is operated by a 1/10 h.p. motor. Exceedingly efficient and compact—17 in. square, 44 in. high. Automatic temperature control regulates degree of coldness of drinking water to suit user.

embodying the vital features of superiority which, in the household models, revolutionized refrigeration.

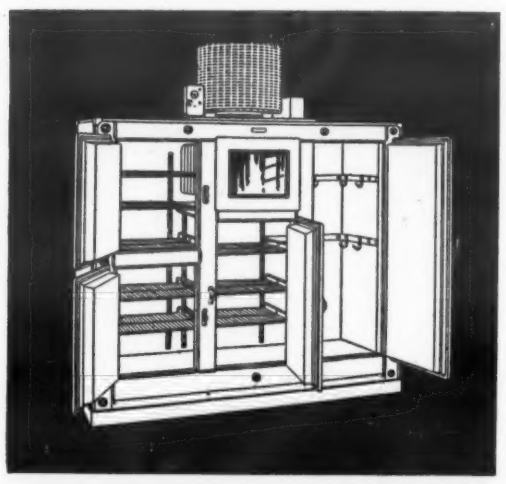
THIS announcement is of paramount importance to firms or individuals confronted with the problem of preserving perishable foods in *large quantities.* After years of research in its laboratories, General Electric has perfected a line of commercial refrigerators *radically different and more efficient.*

An entirely new type. Now, for the first time it is possible to buy as *one complete unit* a cabinet and refrigerating mechanism specifically designed for each other—working together for greatest efficiency at lowest operating cost.

These new refrigerators embody all the vital features of superiority found in the General Electric household models—of which more than 350,000 are in use today, *and not one owner has spent a single dollar for service or repairs.*

This is an unequalled record, made possible by the scientific design and the trouble-free operation of the mechanism.

There are several models of the new General Electric Commercial Refrigerator. Because of there outstanding merit, they provide exceptionally good profit opportunities.



Model C-451 is similar to Model C-450 except that the right-hand portion of the cabinet is furnished with hooks instead of shelves and has a single full length door

SEVEN VITAL POINTS OF SUPERIORITY

1 *Easy to install*—because the cabinet and the refrigerating mechanism are completely combined in one unit.

2 *Greater storage capacity* per square foot of floor area because all the mechanism is on top, out of the way, instead of taking up valuable space elsewhere.

3 *Requires no attention.* The mechanism is simple, quiet, hermetically sealed in a steel casing . . . trouble-free, dust-proof, self-defrosting, never needs to be oiled.

4 *Maximum efficiency* and greatest economy of practical operation.

5 *Completely sanitary* and easy to clean.

6 *Self-defrosting evaporator* which minimizes dehydration, reducing shrinkage of meats and other foods.

7 *An unqualified two-year guarantee.*

EVERY GENERAL ELECTRIC REFRIGERATOR IS HERMETICALLY SEALED

GENERAL ELECTRIC
COMMERCIAL REFRIGERATOR

ELECTRIC REFRIGERATION DEPARTMENT OF GENERAL ELECTRIC COMPANY, HANNA BUILDING, CLEVELAND, OHIO

Dairy Farmers Show Interest In Milk Cooling Equipment

ICE CREAM CONTAINERS OFFERED BY SEALRIGHT

Sealright Co., Inc., Fulton, N. Y., division of Oswego Falls Corp., is manufacturing Sealright containers for the ice cream manufacturer, retailer and dairyman.

These containers are manufactured from Fulton Board, have a double bottom, reinforced, crimped-in-flange. Ice cream containers range in capacity from ¼ pint to 1 gallon. Paper packing trays are made for packing of the ice cream containers, ranging from quart to a gallon. Moist food containers are made in the same sizes.

Paper milk bottles, sizes ½ pint to 1 quart, are offered to dairymen. Sealright butter tubs, jute colored outside with inside manila finish, are manufactured in sizes having capacities of 1, 2, 3, 5 and 10 pounds.

PACIFIC COAST COMPANY SELLS 200 ICE CREAM AND MILK CABINETS IN JULY

K. A. Sanwick, Seattle, Wash., has developed new ice cream and milk cabinets which are being manufactured by the Coast Case & Cabinet Co., Seattle. During the month of July this company sold 200 of these new units in Washington, Oregon, Idaho and Montana.

These cabinets are made of Armco iron, lined with three inches of cork, have Monel metal top, and are manufactured in all sizes, from two to twelve holes, both in line, and abreast. A special cabinet is also built with a bottle cooler compartment with a patented control.

Kelvinator Syracuse, Inc., Syracuse, N. Y., attracted many visitors to its booth in the Dairy Building, New York State Fair, recently, with this display. Milk cooling equipment was prominently displayed along with two domestic cabinets and a water cooler, at the left corner of the exhibitan Esco cabinet hooked up with a Kelvinator Compressor is on display.

RUSS TO DISPLAY AT TORONTO EXPOSITION

Russ Mfg. Co., Cleveland, Ohio, will exhibit at the Dairy Industries' Exposition, Toronto, Canada, October 21 to 26, a 24-foot Russ fountain-luncheonnette, which includes a 50-gallon ice cream storage fountain unit, 3½ steam table, toaster stand and 4-foot sandwich preparation table; a 20-foot luncheonette backbar layout, including two 2-ft. display stands, two 2-ft. coffee urn stands, one 4-ft. sandwich preparation table, one 4-ft. steam table, and one 4-ft. work table; a 12-ft. standard fountain in operation; a 10-ft. standard fountain Sicilian struco slate counter; a dispensing unit and a carbonator.

The fountain equipment which will be exhibited by Russ is built around the Russ all-steel frame construction.

UNIVERSAL COOLER CORP. PRESENTS LARGE LINE OF ICE CREAM CABINETS

Universal Cooler Corporation, with factories located at Detroit, Michigan, and Windsor, Ontario, Canada, offers a complete line of refrigerating units, refrigerators, water coolers and ice cream cabinets.

A variety of cabinets are contained in the two household lines which they manufacture. Their standard line has 16 cabinet models which have a range of from 4.4 to 15 cu. ft. of storage space, and their quality line has 20 cabinet models which have a range of from 4 to 15 cu. ft. of storage space.

Their ice cream line consists of 19 cabinet models which range in size from 2, 3 and 4 hole portable cabinets to a 12 hole cabinet.

Their line of compressors contains a 1/6 and a 1/3 hp. portable, air-cooled unit; a 1/6 and a 1/4 hp. air-cooled, single cylinder unit; a 1/3 and a 1/2 hp. air-cooled, twin cylinder unit, and a 1/2 hp. water-cooled, twin cylinder unit. All air-cooled units have a radiator type condenser which is designed to provide increased cooling efficiency with a lowered current consumption. All units employ methyl chloride as the refrigerant and are controlled by thermostats.

NEW TIME-TEMPERATURE PORTABLE RECORDER FOR ICE CREAM CABINETS

C. J. Tagliabue Mfg. Co., 18-88 33rd St., Brooklyn, N. Y., has designed a new portable temperature and time-operation recorder. The instrument shows the running and idling time of the refrigerator motor and the temperature of the brine. This recorder has been designed for use on ice cream cabinets.

The recorder is enclosed in a light weight, water-proof white enameled pressed steel case with nickel plated fittings.

The machine is connected to the motor of the refrigerator. The bulb is put into the brine. At the end of 24 hours a complete record of the varying temperatures of the brine will be shown.

VICTOR DEVELOPS SEVEN ALL-STEEL MILK COOLERS

Victor Products Corp., Hagerstown, Md., offers 7 models in all-steel milk coolers, ranging in capacity from 2 to ten gallon cans.

Each model is equipped with 22 gauge copper tubing, ½ inch in diameter, dehydrated and sealed. The tubing which circles the inside of the cabinet is supported and protected by wood racks, waterproofed with special varnish. Cover or lid is furnished in either 1, 2 or 3 pieces. The interior is lined with 18 gauge galvanized Armco iron, all seams lapped and soldered; the exterior is covered with 14 gauge steel, with all corners welded; the cover is insulated with two inches of pure corkboard and covered with 26 gauge galvanized Armco iron; the insulation of cabinet is three inches of compressed corkboard, laid in asphalt, and the finish is primed with one coat of lead and oil, and this covered with two coats of gray waterproof paint. Outside seams are welded, inside seams soldered water tight. The tank is equipped with drain and necessary outlet and inlet connections from the refrigerating machine and thermostat.

DALLAS KELVINATOR DEALER COMPLETES LARGE JOB

Dallas, Tex. — The Edwin Sanger Music Corp., Kelvinator dealer, reports the installation of four WB condensing units, four K-351 Ebco water coolers, twelve S-30-R coils and two 9-G Oberdorfer pumps in the Dallas Post Office and Court House.

MUST YOUR SALESMAN DODGE THE SUBJECT OF INSULATION?

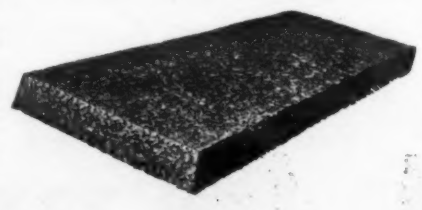
"Well, no, it's not corkboard, but it's just as good" . . . (mental reservation—as long as it doesn't get wet.)

DO YOUR salesmen "talk around" the moisture-danger of cork substitutes? Be frank with yourself. What would they say if they were honest about other-than-cork insulation? At best they could only hope it would stay dry.

Cork is the one insulation that has stood the test of time. It is the standard of the refrigerating world. The meat packers, ice plants, cold storage houses, creameries, and ice cream plants have tried all kinds of substitutes. Today they invariably specify corkboard. It costs them more, but they know it pays.

It will pay you, too. Armstrong's Corkboard Insulation gives long life, absolute dependability and lower operating cost in domestic refrigerators.

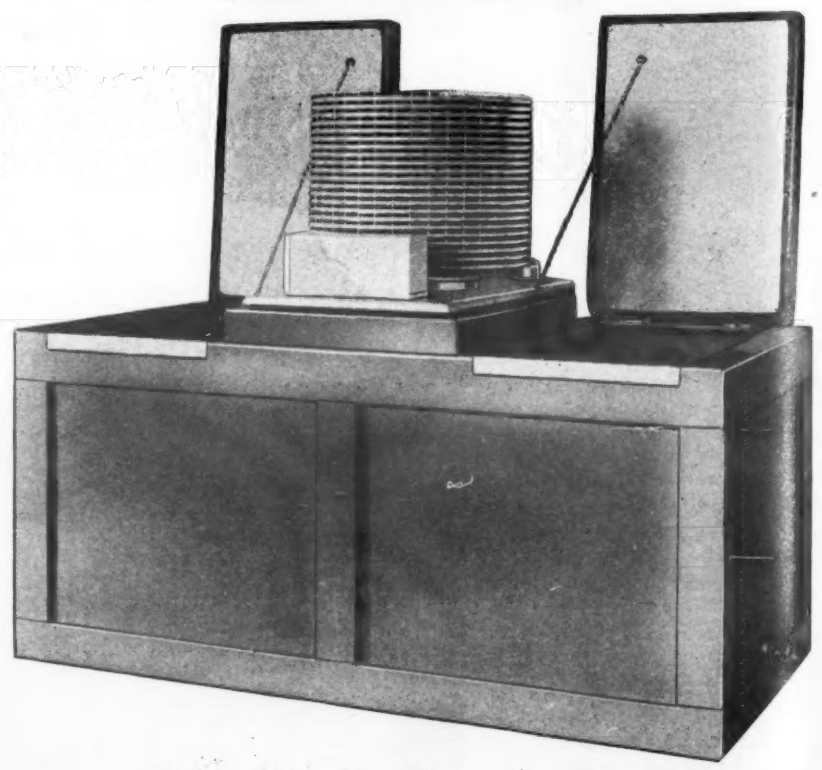
Let us send you full information about Armstrong's Corkboard. Write to the Armstrong Cork & Insulation Company, 917 ConcordStreet, Lancaster, Pa.



Armstrong's Corkboard Insulation

For Household and Commercial Refrigerators

General Electric Designs Immersion Type Milk Cooler



General Electric Submerged Can Type Milk Cooler

Three methods of using an aerator with the new General Electric milk cooler, submerged can type, are described by the Refrigeration Division of the General Electric Co., Cleveland.

The first method of cooling milk with an aerator is used when haste is essential. Cold water from the tank is circulated through the aerator. In the second method, well or spring water is circulated through the aerator in the precooling of the milk.

Method number three is a combination of the first two. The well or spring water is circulated through the upper half of the aerator, entering in the center and leaving at the top. The cold water from the milk cabinet enters at the bottom of the aerator, and is expelled at the center.

These aerator methods are used in conjunction with the new General Electric milk cooler, which has a cooling capacity of four 10-gallon cans per hour and a half. The milk is cooled from an approximate temperature of 55° F. to 50° F. during this time.

The exterior body dimensions are: Width, 73½"; depth, 35"; height, 33½"; while interior dimensions are: Width, 65½"; depth, 28½"; height, 28¾". A General Electric DRD-4 unit is used on the milk cooler. The interior tank is made of rust resisting iron, and floor rack which protects the bottom is made of cypress finished with water-proof varnish. The DRD-4 unit has a copper coil type evaporator designed for operation when immersed in water.

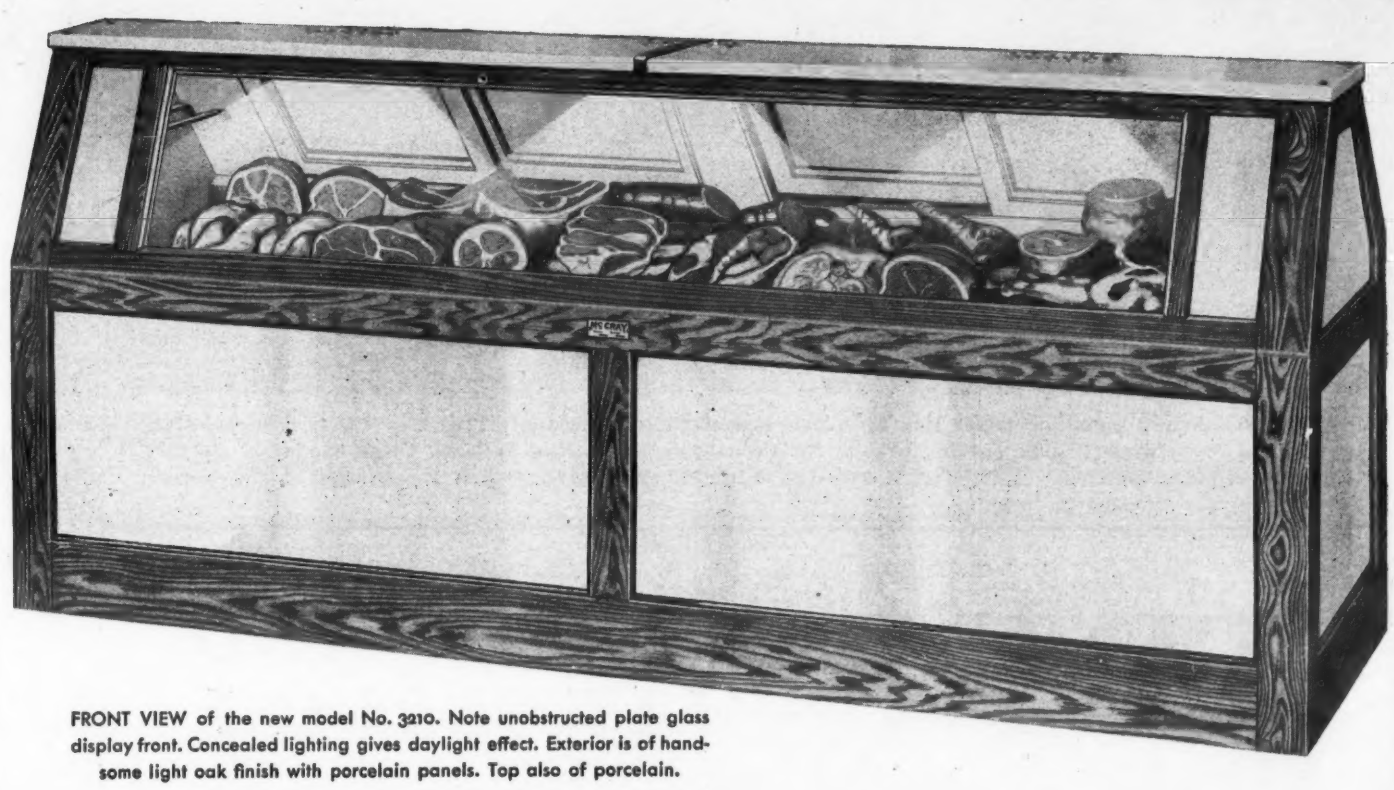
DISPLAY ››› STORAGE REFRIGERATION in a New Unit by McCray

HERE is an entirely new creation by McCray—a refrigerator case that combines in one unit the advantages of attractive DISPLAY, with a generous amount of space for refrigerated STORAGE.

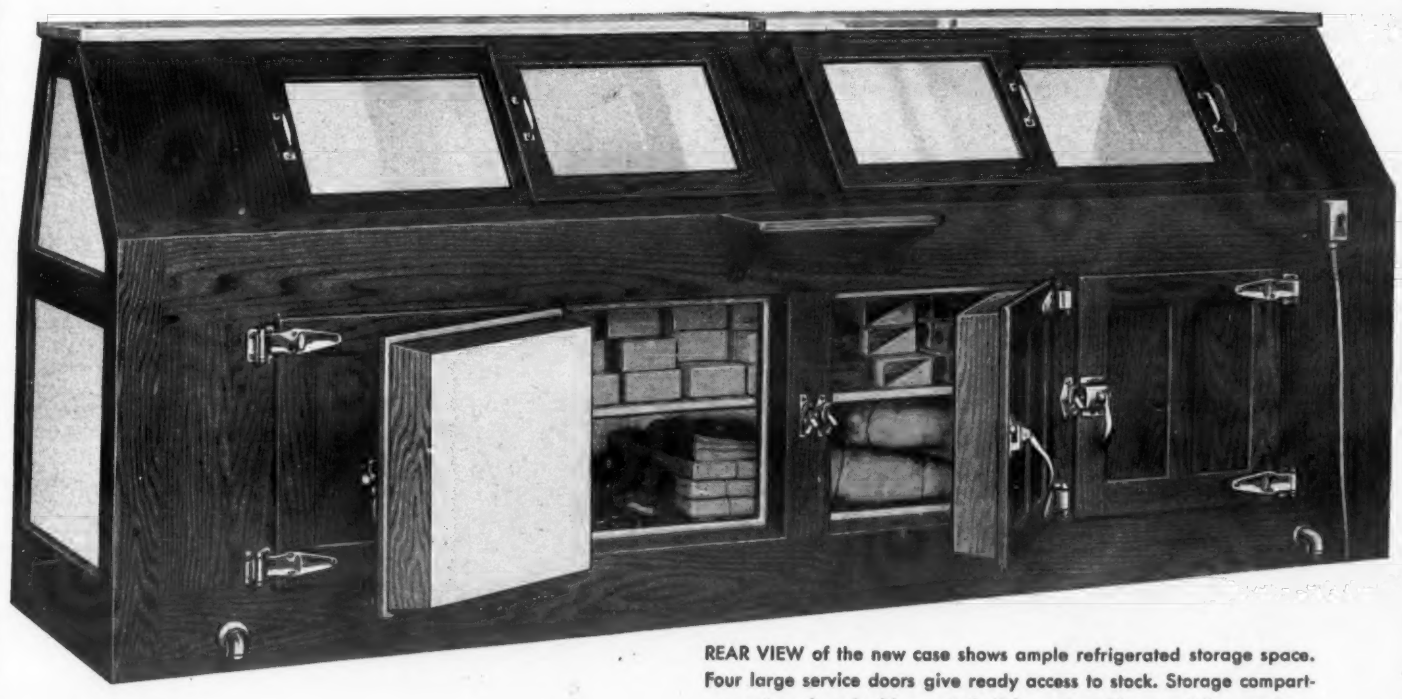
Designed to meet a real need, this new McCray model No. 3210 amply takes care of the requirements of food stores where limited room demands the greatest use of every foot of floor space. In the larger store this case serves adequately as an auxiliary to other equipment.

With a one piece display front of two courses of plate glass and FIFTEEN FEET OF DISPLAY SHELF SPACE, foods can be arranged with telling sales effect. Besides this, there is TWICE THAT AMOUNT OF STORAGE SPACE FOR RESERVE STOCK AND STAPLES. Quick access to this stock is obtained through four service doors in the rear.

And embodied in the new No. 3210 case is the well known McCray standard of construction; quality in every hidden detail which insures thorough, economical refrigeration with spoilage loss eliminated. Food merchants everywhere choose McCray equipment BECAUSE IT MEANS INCREASED SALES AND BIGGER PROFITS.



FRONT VIEW of the new model No. 3210. Note unobstructed plate glass display front. Concealed lighting gives daylight effect. Exterior is of handsome light oak finish with porcelain panels. Top also of porcelain.



REAR VIEW of the new case shows ample refrigerated storage space. Four large service doors give ready access to stock. Storage compartment equipped with wood shelf in center. Also wood floor rack.

For Use with Any Machine

THE McCRAY No. 3210 DISPLAY - STORAGE CASE is built for mechanical refrigeration only. As with all McCray models, any type machine can be immediately installed. No changes are necessary. In this unit, a coil space at each end provides for the cooling of the entire inner compartment. No partition separates the upper and lower sections. Pure corkboard insulation, sealed with hydrolene cement, keeps cold air in and warm air out.

WHATEVER TYPE MACHINE is used, the sterling in-built quality which has characterized the name McCray for 40 years, is a guarantee of the most satisfactory performance. This is of special interest to dealers in mechanical refrigeration as the right equipment is necessary for a successful installation.

McCRAY is the world's largest manufacturer of refrigerators for all purposes. Dealers in machine refrigeration should get the facts now regarding the McCray line. Write for catalogs. No obligation, of course.

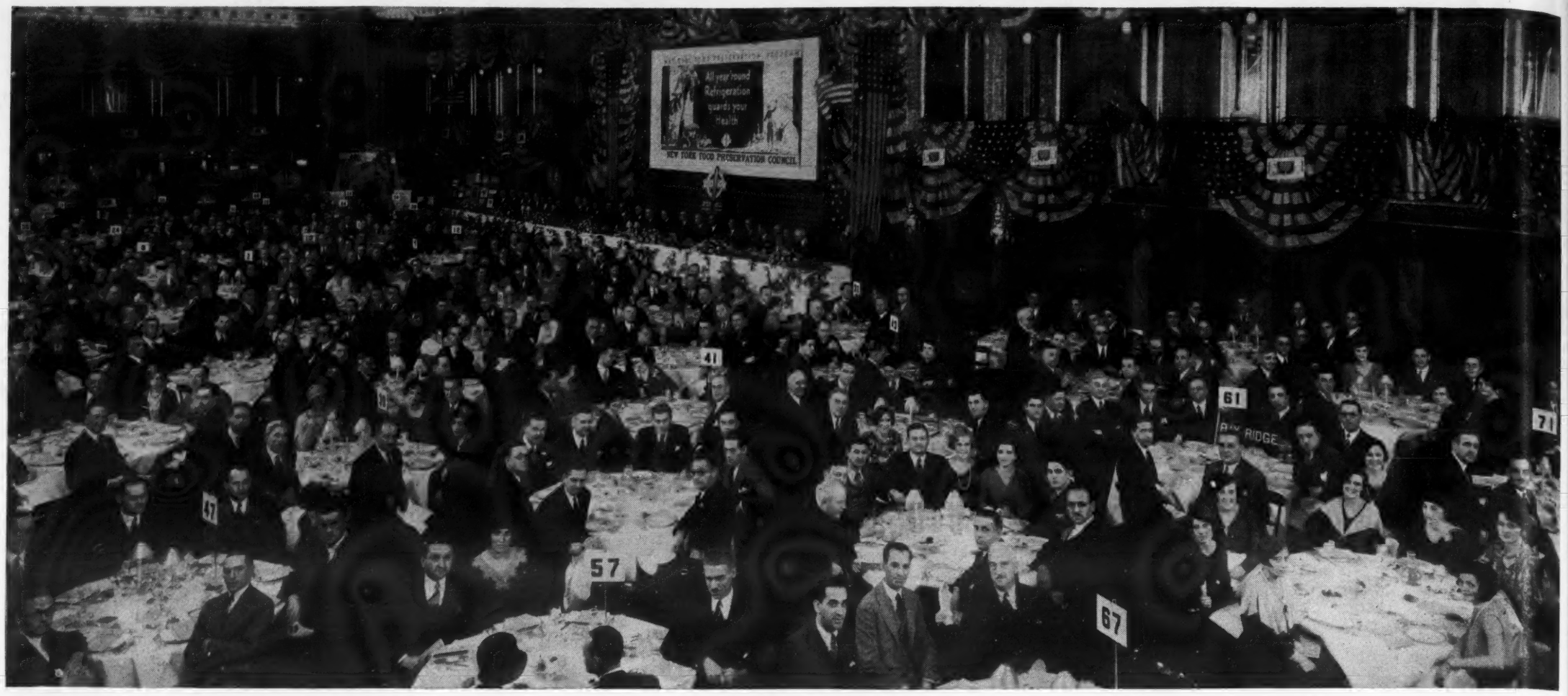
McCRAY REFRIGERATOR SALES CORPORATION, Dept. 66, Kendallville, Indiana

SALESROOMS IN ALL PRINCIPAL CITIES (See Telephone Directory)

WORLD'S LARGEST MANUFACTURER OF REFRIGERATORS FOR ALL PURPOSES

McCRAY REFRIGERATORS

G. E. Distributor Prepares For Winter Sales In New York



Dealers and salesmen operating under Rex Cole, Inc., metropolitan distributor of General Electric refrigerators, attended an "open winter" sales meeting held at the Commodore Hotel, New York, N. Y., on September 20, 1929. Winter sales plans were discussed by representatives of the Electric Refrigeration Department of the General Electric Co. who attended the meeting.

FREE *ELECTRO AND MAT SERVICE*

For Flexo Tray Dealers

Hundreds of dealers are tying-up with Flexo-Tray national advertising. And now we have prepared a folder showing complete ads, and illustrations that are available to you in either mats or electros. All cuts are numbered for your convenience. Be sure to get your copy.

Flexo Tray, as a sales promotion tool, to be used for making sales of new machines, is unique in the industry. There's a lot more to Flexo-Tray than the immediate profits, which are good. Our new book of 20 pages, "How to Sell Flexo-Tray," is full of concrete sales helps. It will be mailed, free of charge and without obligation to any salesman, dealer or distributor in electric refrigeration.

It is full of sales ideas that will prove of real help to you.

Send the coupon today, and we will send you the desired literature at once.

Bend or "Break" Flexo Tray

Remove One Cube or All

Made of Pure Crepe Rubber

Mail This Coupon Today

G. M. DWELLEY, Inc., Curtis Building, Detroit
Please send the literature checked below:

- ☐ Booklet—"How to Sell Flexo Tray"
- ☐ Folder—"Free Mat and Electro Service"
- ☐ Folder, describing Flexo Tray, with list of models now available

Name.....
Address.....
City.....State.....

Flexo Tray, the Pure Rubber Ice Cube Tray, is advertised in these National Magazines:

Good Housekeeping
Ladies' Home Journal
House Beautiful
McCalls
Pictorial Review
House and Garden
Better Homes and Gardens and American Home

G. M. DWELLEY, Inc.

Curtis Building, Detroit, Michigan

EVANSVILLE UTILITY MEN HOLD BASEBALL CONTEST

Southern Indiana Gas & Electric Company, Evansville, Ind., is running a baseball campaign on the sale of Servel refrigerators this month. The salesmen are divided into two teams, each with a captain, and every man is assigned to a baseball position. Edward McGinness, sales manager, is umpire.

For every $100 sale, the player is given credit for a home run; $75 sales count as a three-base hit, $50 sales as a double, and $25 sales as singles.

Point awards are made for these respective sales, the points being 50, 30, 25 and 20, respectively. If a player does not make a score at all on any day, that counts as a strike-out, with a penalty of ten points. The player who gets a prospect who belongs to the other team is charged with an error and is penalized three points. Mr. McGinness will give a dinner for the winning team.

DOUGLAS NOW WITH LIQUID COOLER

Detroit, Mich.—Ray G. Douglas, until recently advertising manager of the Norge Corp., has become associated with Herbert C. Kellogg in the Liquid Cooler Corporation, makers of the Temp-Rite cooling units and fixtures, 6527 Russell Street.

Mr. Douglas was formerly with Servel Sales, Inc., Evansville, Ind. Prior to that time he was connected with trade extension work, various plumbing and heating enterprises and with manufacturers of advertising specialties. His duties with Liquid Cooler Corp. will embrace both sales and advertising.

GEORGIA POWER WOMEN HEAR REFRIGERATION TALK

Atlanta, Ga.—Frank Loughran, sales manager, Alexander-Seewald Co., Atlanta, Ga., addressed the women's committee of the Georgia Power Co. at the Electric Building, September 19, on the "Principles of Refrigeration." Fern Snider, home service director of the company, gave a short talk on "Food and Health."

COPELAND DEALER MOVES TO NEW QUARTERS

Mt. Clemens, Mich.—Macomb Copeland Co. recently moved from 48 Cherry Street to new quarters at Walnut and New Streets. A formal opening of the new headquarters was well attended by the public.

CLARK & JONES COMPLETE CHAIN STORE INSTALLATION

Birmingham, Ala.—Clark & Jones, Kelvinator distributors here, report commercial sales of two Kelvinator condensing units, Models R-30 and F-30 to the A. & P. Tea Co., Gadsden, Ala. Similar plants were also installed in six A. & P. stores in Birmingham. Models R-30 and F-30 condensing units were also installed for the Regerner Quality Shoppe, Birmingham.

DOHERTY SUBSIDIARIES REPORT SALES OF 806 REFRIGERATORS IN JULY

The utility division of Henry L. Doherty & Co., New York, reports that its subsidiaries sold 806 domestic and commercial refrigerators in July, making a total of 6,219 for the first seven months of this year. Toledo Edison Co. sold 199 refrigerators during July, bringing its sales total up to 1,551, while the Ohio Public Service Co. sold 180 refrigerators, bringing its total for the year up to 2,025.

In a recent Kelvinator contest, which ended July 15, Sam West, salesman for the Denver district of the Colorado Public Service, won first prize in the central western division. His sales totaled $16,855 for the six weeks of the contest.

MICHIGAN FRIGIDAIRE MEN PLAN DETROIT MEETING

Detroit, Mich., Oct. 9.—Sales policies and plans for the remainder of the year will be made by dealers and salesmen from the eastern Michigan sales districts of Frigidaire Corp., who will meet here tomorrow for a one-day business meeting.

Addresses by factory officials also will make up a part of the program, Edward E. Rousch, Detroit manager, said. Honors will be accorded selling men who have completed the first three-quarters of the year with exceptional records.

TAYLOR VISITING EUROPEAN REFRIGERATION PLANTS

New York—Dr. R. S. Taylor, assistant director of the Electrolux-Servel laboratory in New York, left on August 10, 1929, for an extended trip to Sweden and England. He is studying the household refrigeration industry in these countries.

MOON ORGANIZATION GETS BRYANT AGENCY

Bryant Electric Refrigerator Corp., New Milford, Pa., has appointed the Leon Moon Organization, 1133 Broadway, New York, eastern factory representatives. J. B. Greiner, Jr., is in charge of the electric refrigeration division. He was formerly in the apartment house division of the Domestic Electric Co., Inc., metropolitan New York distributors for Frigidaire.

N. E. L. A. HEAD TO SPEAK AT CHICAGO MEETING

Chicago—The Electric Association announces a dinner, to be given at the Palmer House, here, October 22, seven o'clock. Matthew S. Sloan, president of the N. E. L. A., will give an address.

SAMSON CUTLERY COMPANY REORGANIZES

Samson Cutlery Company has been reorganized as the Samson-United Corporation, Rochester, N. Y.

DAIRY REFRIGERATION

Control Systems For Ice Cream Freezing Equipment

XL Refrigerating Co., Inc., Chicago, Ill., offers a direct expansion cooler equipped with Hilger multi feed header and a Hilger temperature difference no-freeze back control valve. The Hilger no-freeze back control valve supplies the proper amount of liquid ammonia to the cooler in proportion to the refrigeration load upon the cooler. This control valve is actuated by the temperature difference between dry and saturated gas. In other words, the Hilger no-freeze back control valve simply meters the liquid ammonia put into the cooler, in proportion to the condition of the gas leaving the cooler, irrespective of the refrigerating load. The Hilger valve system is particularly adapted to controlling direct expansion units in ice cream and dairy plants.

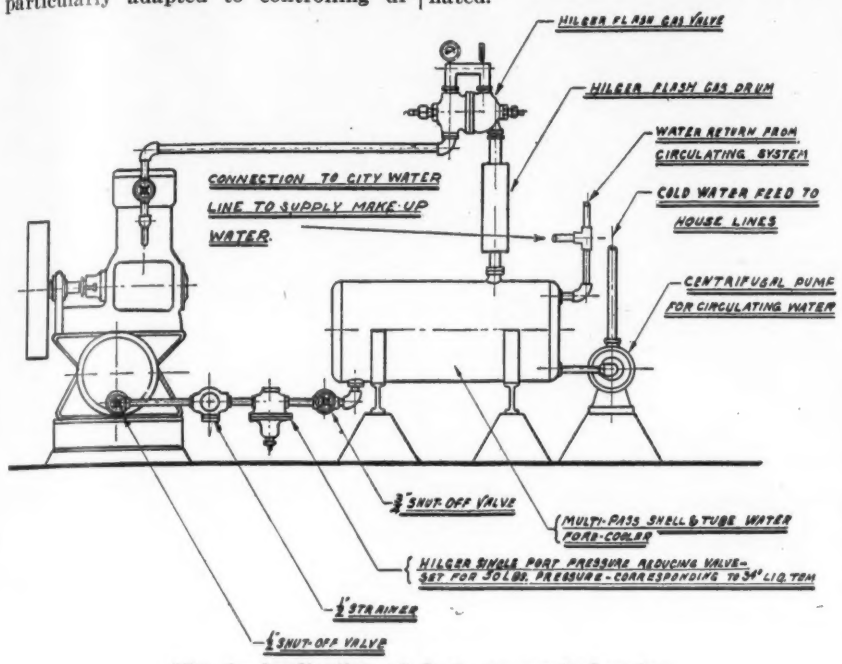

HILGER FLASH GAS VALVE
HILGER FLASH GAS DRUM
WATER RETURN FROM CIRCULATING SYSTEM
CONNECTION TO CITY WATER LINE TO SUPPLY MAKE-UP WATER.
COLD WATER FEED TO HOUSE LINES
CENTRIFUGAL PUMP FOR CIRCULATING WATER
¾" SHUT-OFF VALVE
MULTI-PASS SHELL & TUBE WATER COOLER
HILGER SINGLE PORT PRESSURE REDUCING VALVE-SET FOR 30 LBS. PRESSURE-CORRESPONDING TO 34° LIQ. TEM
½" STRAINER
½" SHUT-OFF VALVE

Fig. 1—Application of flash gas control system

The multi feed system for evaporating units is a new development in connection with this kind of equipment. The liquid ammonia is fed into the multi feed header, which in turn distributes the liquid ammonia to the cooler at a number of points, thus allowing every foot of the surface to be supplied with liquid. It is a flooded system with recirculation of the liquid ammonia over and over again throughout the different parts of the cooler. Gas evaporated in any section of the cooler is taken into the header and then into the suction line, to the ammonia compressor. From the type of construction used in the header, it will be noted that there is very little difference in pressure between the top and bottom of the cooler. This is due to static liquid pressure or pressure difference due to friction of gas flow.

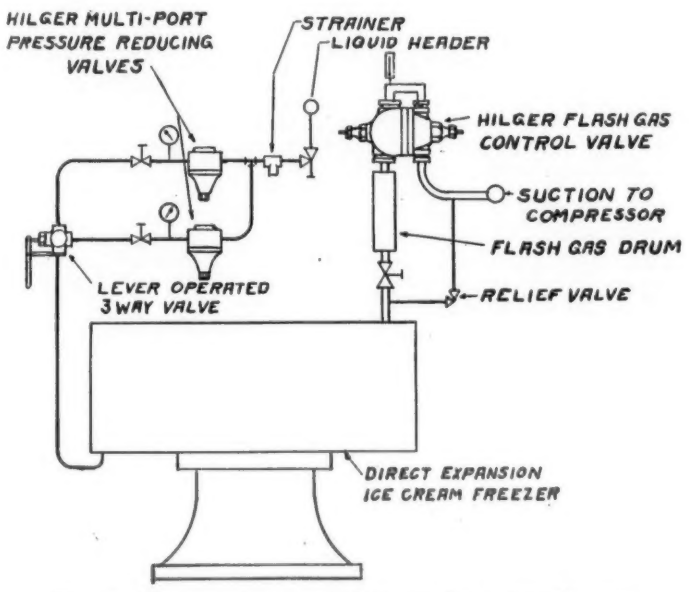


Fig. 2—Three pressure system on ice cream freezer

Hilger Flash Gas Control System

The flash gas control system may be used for accurate and safe control of an evaporator such as is illustrated in Figure 1. The liquid ammonia passes from the liquid receiver through a strainer and a pressure reducing valve. The pressure is set by means of the adjusting stem on the pressure reducing valve.

The function of the Hilger flash gas control valve is to regulate the amount of liquid admitted to the cooler in proportion to the refrigeration load demanded. The pressure in the cooler may be equal to or above the suction pressure at the machine.

For example, the pressure in the cooler may be 50 lbs., while the suction pressure at the machine may be only 20 lbs., as determined by the relative load on the cooler and the comparative displacement of the compressor.

When the suction pressure at the machine is below the pressure in the cooler, this control valve automatically releases the gas from the cooler, and at the same time its action is co-ordinated with the other pressure reducing valve is set for the ammonia pressure desired during the whipping or beating period, and by means of the manually operated three-way valve, it is possible to maintain either high or low pressure on the ammonia in the freezer, at the will of the operator.

The flash gas control drum and valve regulate the relative amount of ammonia in the freezer in proportion to the superheat in the gas leaving the freezer. The amount of superheat in the gas leaving the freezer may be regulated by means of the adjusting stem on the flash gas control valve. When the flash gas control valve is set for a given superheat, and the superheat decreases due to excess liquid in the freezer, the flash gas control valve will tend to gradually close, thereby slightly increasing the pressure in the freezer and checking the flow of liquid ammonia into the same. When the superheat increases due to a lack of liquid ammonia in the freezer, this valve tends to gradually open, thus reducing the pressure in the freezer slightly and causing more liquid ammonia to flow into the same. Under operating conditions the system comes to a working balance and automatically supplies the correct amount of liquid ammonia to the freezers. The suction pressure in the main suction line may be equal to or below the lowest pressure used in the freezer.

The three pressure temperature difference flash gas control system provides an efficient means of controlling direct expansion ice cream freezers. The system as shown in Figure 2 consists essentially of a liquid strainer, automatic pressure reducing valves, a manually operated three-way valve, a flash gas drum and a temperature difference flash gas control valve. One of the pressure reducing valves is set for the ammonia pressure desired in the freezer for the freezing period; the

KELVINATOR EQUIPMENT PLACED IN PRISON FARM

Convicted to a life term in the kitchen of Oakalla Prison Farm at Burnaby, British Columbia, is the fate of the latest Kelvinator commercial equipment to be installed by the Jarvis Electric Co., Ltd., distributors for lower British Columbia.

The installation consists of one Model WK condensing unit, two No. 4885 and one No. 4886 Kelvin Koolers in a two compartment walk in room 9 feet by 13 feet by 8 feet 6 inches ceiling inside, and a Model AFE compressor operating a 75 pound ice maker. The box, specially constructed by the Provincial Department of Public Works, is located in a cool section of the basement. It has a brick outer wall with air space, refrigerator paper, and four inches of corkboard, and an interior finish coat of cement plaster. The meat compartment, 9 by 9, is cooled by two No. 4885 Kelvin Koolers, and the butter and cooked meat compartment, 4 by 9, is served by a No. 4886 Kelvin Kooler.

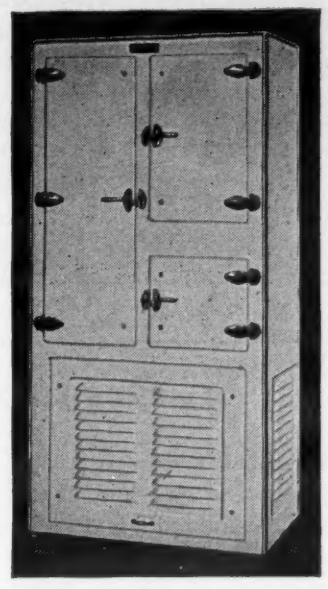
Drastic Price Reductions

ON

BOHN all-porcelain base cabinet models

WHITE PORCELAIN, OUTSIDE AND INSIDE

5, 6, 7, 9 and 12 Cubic Feet of Food Storage



The handy base cabinet may either be used for refrigerating machinery or the storage of cooking utensils, canned goods, vegetables, etc.

These beautiful BOHN refrigerators, with their heavy insulation, sturdy general construction, and patented air-circulating principles, are an assurance that your units will render perfect refrigeration and do so economically.

Write for details of these remarkably low prices.

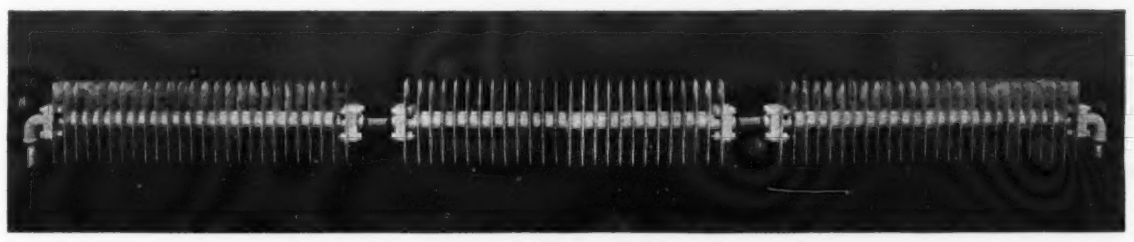
Many models for remote installation are also greatly reduced.

Bohn is the World's Largest Builder of Quality Refrigerators

BOHN REFRIGERATOR COMPANY
SAINT PAUL, MINNESOTA

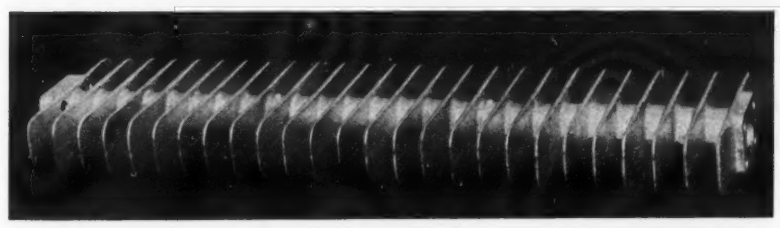
FIVE CLEVELAND EVAPORATORS

ONE FOR EVERY REFRIGERATION REQUIREMENT



No. 3 Evaporator Assembly for 10′ and 12′ Display Cases

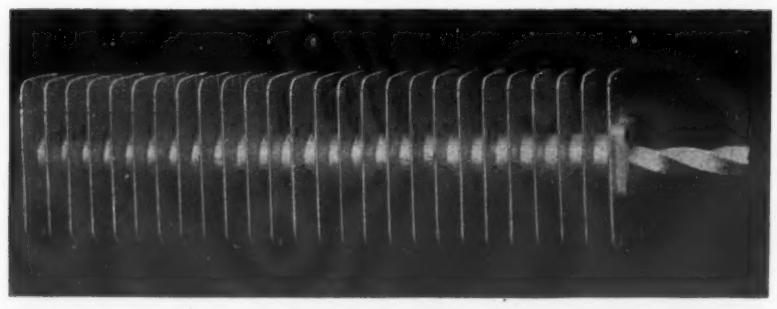
For double duty counters.



Evaporator No. 1

Salad pans and display cases.

For back icing top display counters.



Cooler bunkers and ice cream hardening rooms.

Showing Evaporator No. 3 with Evaporating Core

1. Defrost at each shut-down period, thereby providing clean metal surface for rapid heat transfer when compressor starts.
2. A hold-over capacity without the objectionable features had with brine pans or tubes.
3. A better circulation is had on account of the fixed air travel through evaporator fins, thereby greatly increasing heat transfer and radiation efficiency.
4. Where EVAPORATORS are installed in combination in cooler bunkers, top display cases and a service refrigerator, the lineal feet of gas travel from expansion valve to compressor is approximately 15% of that had with pipe coils.
5. EVAPORATORS are rust-proofed by our fused zinc coating process. The zinc, being fused at a high temperature, is blown into all exposed surfaces of EVAPORATOR at a very high velocity, giving a uniform coating, and rust-proofing for all time to come.
6. Where EVAPORATORS are used in combination in both cooler bunkers and display cases, power costs are decreased by 33⅓%.
7. We positively guarantee EVAPORATORS to hold a better temperature in single glass display cases than can be held in triple glass cases with open coils or brine tubes, and at less cost of operation.
8. EVAPORATORS of various sizes can be carried in stock, and their great flexibility enables you to sell today and install tomorrow. During the season, many orders can be saved on account of this.

The Cleveland Evaporator Co.

6400 Breakwater Avenue PATENTS PENDING CLEVELAND, OHIO

ELECTRIC REFRIGERATION NEWS

The Business Newspaper of the Refrigeration Industry

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Organized Activity

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Conventions are recognized as a large factor in American business. The size and character of the meetings have come to be a measure of an industry's importance in the economic development of the nation.

During the month there will be two big conventions and exhibitions at which much attention will be focused upon refrigeration. The annual Dairy Industries' Exposition, to be held in Toronto, Canada, October 21 to 26, is one of the big events of the year due to the important position which refrigeration has assumed in the production and distribution of dairy products.

Another big gathering will be that of the American Gas Association in Atlantic City, October 14 to 18. Having observed the results of refrigeration as a load builder for the electric light and power companies, the gas utilities are actively turning their attention to the possibilities of developing their own market through gas refrigeration.

This week there will also be two important conferences at which specific problems affecting refrigeration will be taken up for intensive study. In Washington, D. C., the Refrigeration Division of the National Electrical Manufacturers' Association is meeting, with other divisions of the Association, to consider matters of general policy. Executives and engineers representing the leading manufacturers of electric refrigeration systems will give special attention to the problem of securing a uniform code, the collection of statistics covering production and sales, the recommendation of standards of practice covering such matters as warranties, methods of billing and time payments, and other subjects of common interest.

This week also, in New York City, the Refrigeration Committee of the Commercial Section, National Electric Light Association, will formulate plans for consolidating the results of the National Food Preservation activity carried on during the month of September. Thought will be given to the question of continuing this broad educational work.

In addition to these co-operative organizations, manufacturers are holding big meetings with their distributors and dealers to present new designs and applications of equipment, and to explain advertising and sales promotion campaigns. All Kelvinator distributors are gathered in Detroit this week. A series of local meetings of General Electric distributors and dealers, started in September, will be completed this week with sessions in Charlotte, N. C.; Houston, Tex.; Richmond, Va.; Washington, D. C.; Fresno and Los Angeles, Calif.

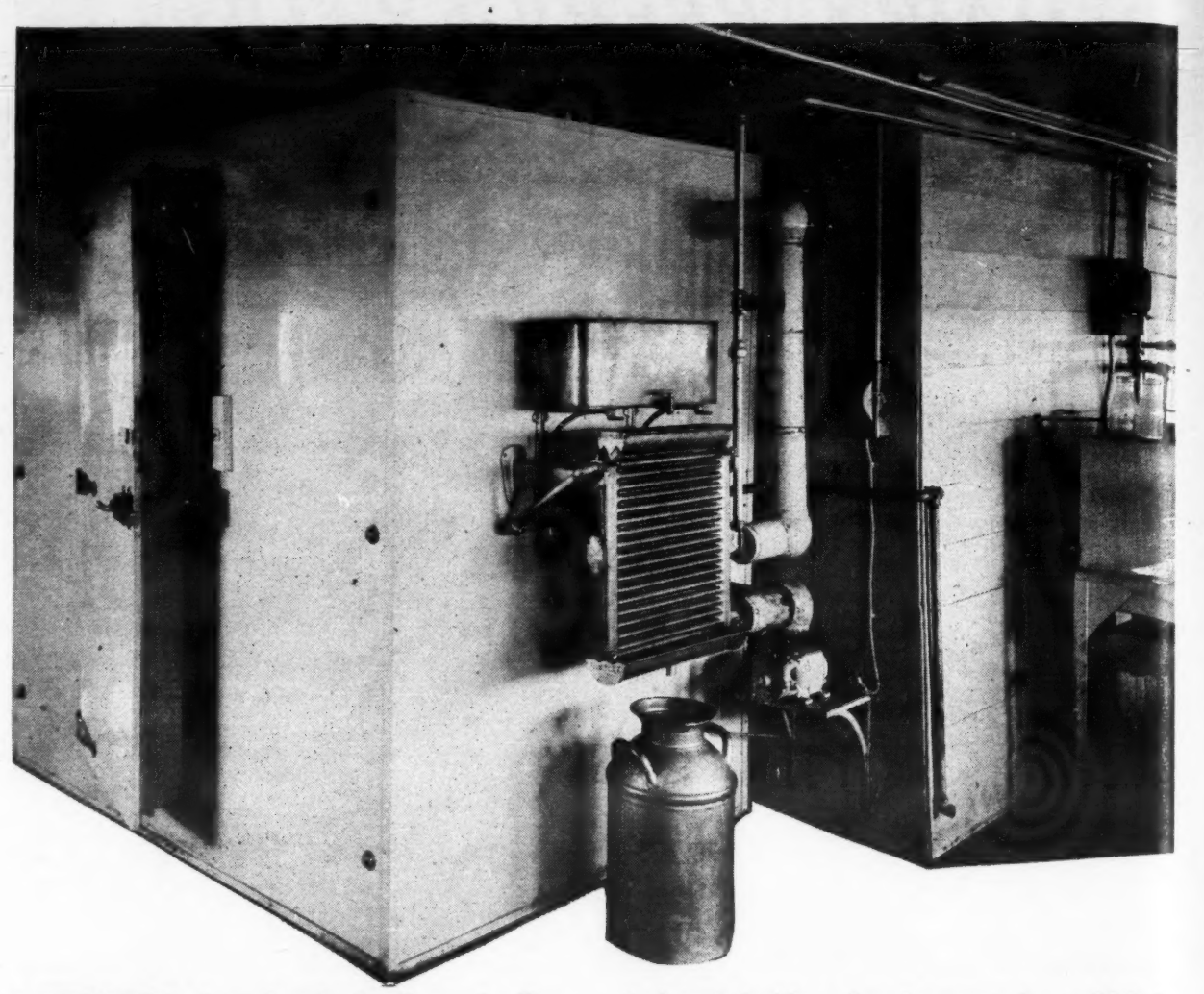
As the beehive has long been a symbol of organized activity, so the convention represents the effort of an industry to accomplish something by the exchange of ideas and experience. Skeptics there are, it is true, who question the reputation of the bee and assert that it does a vast amount of buzzing around to no purpose. Conventions may be open to the same criticism. It is probable, however, that the fault-finding is mainly done by those who attend with the expectation of being entertained or enlightened without thought of making a contribution for the benefit of others. Those who invest their own thought and effort in the enterprise are most likely to be the ones to reap the greatest reward.

A certain amount of discussion is necessary to arrive at an understanding of any problem. It sometimes appears that nothing is done about a problem at a convention except to talk about it. Often this is true, but if the talk results in a broader and clearer understanding of the whole industry's problems by those who are responsible for the methods and policies of individual companies, then real results may be expected to follow later.

That conventions have been found worth while in the dairy industries is indicated by the fact that the International Association of Ice Cream Manufacturers will hold their Twenty-ninth Annual Convention, while the International Association of Milk Dealers will hold their Twenty-second Annual Session in connection with the Toronto Exposition. Even more notable for continuity of effort will be the Fiftieth Annual Meeting of the American Society of Refrigerating Engineers to be held the first week in December.

Even a bee may be pardoned if it spends a portion of its time in bee talk with its fellows if the conversation results in a decision to co-operate in bringing in more money for the benefit of all.

Indiana Show-Place Dairy Uses Servel



UPWARDS of one hundred gallons of milk a day are chilled in this Servel equipped surface cooler at the Graham Farms, Washington, Ind. Through the upper section of the cooler spring water is circulated, and through the bottom calcium chloride by means of a small centrifugal pump. This is cooled in a galvanized steel tank inside a five by seven box which is galvanized steel exterior and interior lined.

The dairy has become one of the show places in its section of Indiana, many visitors visiting it yearly. A calf nursery is one of the newest additions to the farm, and contains about fifty calves which are looked after with as much care as children.

ELECTRIFICATION OF HOMES LAGGING BEHIND INDUSTRY

New York—The American home has fallen behind American industry in the use of electricity, according to Matthew S. Sloan, president of The New York Edison Company and associated companies, and president of the National Electric Light Association. In an address at the annual convention of the Empire State Gas and Electric Association held at Saranac Inn, Upper Saranac, N. Y., September 19, Mr. Sloan urged that American homemakers be freed from labor conditions below those of their husbands working in factories.

"The American home is lagging behind industry," he said, "because we, of the power and light industry, have neither taken full advantage of our opportunities as business men nor done our full duty as agencies of public service."

The American home can be made as efficient electrically as American industry by two lines of effort, he declared—by intensive and continuous merchandising, electric service selling, and by readjustment of rate schedules.

"The American woman, the homemaker," he said, "has not been sold as she should be on the idea of using electrical power instead of muscle power for housework. She has not been told what electrically powered appliances will do or how properly to use them. She is far too often spending time and energy on drudgery which should be devoted to other purposes. Our industry has been instrumental in freeing thousands of women from broom and dustpan and washtub, releasing them for higher duties in home and society, but there are thousands on thousands of others who toil and slave in their homes today as their husbands would not dream of doing in mill or factory.

"Hand in hand with electric service selling effort must go, I believe, a readjustment of rate schedules if selling effort is to be most successful. If we could get the increased domestic business we desire, we could afford to make the sales at a lower average unit price. As we establish that lower unit price we shall get the increased business we desire, not automatically but by working for it as the motor car manufacturer, the shoe manufacturer, the department store proprietor does."

According to the Dayton (Ohio) Herald, more than 17,000 Daytonians are now working for the General Motors Corporation, and nearly 70,000 people residing in Dayton and its immediate vicinity are directly or indirectly dependent upon General Motors for a livelihood.

AN INVITATION TO MANUFACTURERS

Manufacturers of parts, materials and accessories for refrigeration equipment are invited to furnish full information regarding all new products, for publication in the November 20 News.

Manufacturers of domestic and commercial refrigerator cabinets are invited to furnish pictures and data regarding new designs and improvements, new sizes, models and applications, for publication in the November 6 issue of the News.

COLLIERS' STORY PEEVES ICE INDUSTRY

Rumblings have been reported in the ice industry over a story "Homer Gets Along," by Gerald Mygatt, which appeared in Collier's September 7 issue, opposite a full page advertisement of the National Food Preservation Program.

The story deals with the trials and sorrows of having an ice man who simply will not listen to what the housewife tells him. Sample paragraph: "Remember, it's because his shoes are always wet and muddy, and he won't listen to me, and he insists on chipping the ice on the floor instead of out in the driveway, and then he takes his dirty wet feet and kicks the pieces under the icebox—and every day after he goes I have to get down on my hands and knees and it isn't as if I didn't have enough to do without that."

ICE MEN TROUBLED BY FEAR OF THE UNKNOWN

By W. C. MOORE, Advertising Manager, General Refrigeration Company, Beliot, Wisconsin

Reprinted from Advertising and Selling, September 18.

I have read with interest the article by Emily Woodward, entitled "What Is the Future of the Ice Industry?" as published in the August 7 issue of "Advertising and Selling," and I believe she sees the situation in the right perspective.

The trouble with the ice industry has been purely imaginary fear of the unknown, just as the child fears, not the dark, but those unseen, imaginary and most fearful creatures that may lurk on all sides. To the ice industry, the mechanical refrigeration industry is a fearful monster likely at any moment to devour its business, while as a matter of fact the mechanical refrigeration industry has done the ice industry more good in one decade than the ice industry has accomplished for itself during its entire lifetime.

Not so many years ago the natural ice industry was supplanted by the manufactured ice industry, which means that the ice industry, as it exists at present, actually gobbled up another business in attaining its present development, and is now fearful that it will suffer the same fate. On the contrary, the ice industry will continue to grow, and the growth will be healthy, and, I believe, permanent.

What will cause this healthy and permanent development? Most important, probably, is the fact that with the fear of the unknown in their hands, the scatturers and dealers, organized for mutual protection into one of the strongest unions in the country—and "in union there is strength." They then awoke to the fact that they had not been selling a service or a need, but had been delivering ice to people who "took ice." If they tried to sell at all, their theme was "buy your ice from the Acme Ice Company," meaning "instead of from the Emca Company." No attempt to sell the need or the service; no effort to develop new outlets; just a constant endeavor to get the other fellow's customer.

Both industries are here to stay, and the time is not far distant when, instead of an ice industry and a mechanical refrigeration industry, there will be simply a refrigeration industry. There is need for both. Some jobs only a machine can handle; other jobs can be handled only by ice; other jobs may be handled by either, in which case either convenience or economy, or both, will determine the method used.

The ice industry needs well directed, intensive selling of the need as well as the product. It should find a way of making it easy for the great army of non-users of ice to become users. It should effect economies in delivering and charge the customer only for the actual poundage delivered.

In order to make it easy for non-users to become users of ice, the ice companies, through their association, might arrange for a source of good refrigerators in a few standard sizes, these refrigerators to be of high quality, yet bought in such tremendous quantities as to be had at a very low price. These refrigerators might then be placed in the homes of present non-owners by (a) outright sale, (b) installment sale, (c) rental adjustment, (d) at no cost but contingent upon the use of a minimum quantity of ice per month, the refrigerator to remain the property of the ice company.

The future of the ice industry, then, depends upon the industry itself. It now has a tremendous market, and there is plenty of room for expansion. If it loses out in certain fields, it is only because it is not economically fitted for those particular tasks. Instead of worrying about this business lost to the mechanical refrigerating machine, let them devote their energy to the strengthening of their remaining markets and the development of new outlets. That done, and there will be no cause for worry.

REFRIGERATION SALES HELPED BY AMERICAN TOURISTS IN EUROPE

EUROPE is beginning to cool off, in a refrigeration sense, is the opinion of Harry M. Robins, president of Harry M. Robins Co., Detroit, export distributors for Copeland Products, Inc., following his recent several months business tour of the continent. He declares that slowly but surely Mr. European and his wife are learning the benefits and merits of refrigeration, of which to date they have practically been unaware.

"The American predilection for ice water and ice drinks has long been a cause for wonder to Europeans," says Mr. Robins, "but they themselves are beginning to enjoy them. People of all classes are awakening to the value and economy of proper refrigeration. Up to now, as many Americans who have visited Europe know, a demand for ice water usually caused a stir around a European hotel. The scurry often ended with the guest being told there was no ice to be had. This was generally true—especially if the local brewery, the only source of ice, was closed for several days, as frequently happens.

"Now, due possibly to the demand of Americans for ice water and iced drinks or to the growing realization that refrigeration is a primary economic factor. Europe is beginning to take its refrigeration seriously. Also it is changing its likes in food and the taste for cold drinks and desserts is becoming widespread.

"To date 80% of the mechanical refrigeration sales in Europe are to storekeepers, but this proportion will steadily drop as the European housewife, no different from her American sister, demands refrigeration and especially that of the automatic type. This applies even in those colder portions of Europe, where refrigeration is not so great a problem.

"I found keen interest in refrigeration in Italy, Switzerland, Austria, Germany, France, Spain, and Holland, and discovered that the way to the subject had been paved for me by the effective organization in all those countries of the U. S. Department of Commerce. I think much credit for the development of interest in mechanical refrigeration can be given the department's representatives overseas."

FRIGIDAIRE MAN STUDYING SOUTH AMERICAN MARKET

Dayton, O.—H. R. Coate, foreign advertising manager of Frigidaire Corporation, left Dayton September 18 on a three-month trip to South America, where he will make an intensive survey of economic conditions and market potentialities, with special regard to Frigidaire and its advertising. He sailed from New York September 21 with F. E. Sheehy, South American representative of Frigidaire Corporation.

Montivedio, Uruguay, will be Mr. Coate's first stop. From there he will go to Buenos Aires, Argentina, and from there across the Andes Mountains to Santiago, Chile, on the west coast of South America. He will return across the continent to the east coast, where he will go to Sao Paulo, Rio de Janeiro, Bahai and Pernambuco.

HARLAN RETURNS TO DUTIES AFTER TWO MONTHS ABROAD

Dayton, O.—J. A. Harlan, sales manager of the distributor division, Frigidaire Corp., returned to his Dayton, Ohio, office, September 23. He had just completed a two months' vacation abroad where he made a study of European reaction to American selling methods. Mr. Harlan's itinerary consisted of the Azores Islands, Portugal, France and Italy

LUNDQUIST TO VISIT SOUTH AMERICAN DEALERS

R. A. Lundquist, export manager for Kelvinator Corp., Detroit, is sailing for South America, October 19, on the "Southern Cross."

ILLINOIS REFRIGERATOR CO. TO GET FERRO FURNACE

Morrison, Ill.—A large porcelain enameling furnace is now being built for Illinois Refrigerator Co. by the Ferro Enamel Supply Co., Cleveland, Ohio. This is the second furnace to be built for the Illinois Co. by Ferro Company.

ED FRIEDRICH MOVES TULSA BRANCH OFFICE

Tulsa, Okla.—Ed Friedrich, manufacturer of commercial refrigerator, announces the removal of the Tulsa branch to its larger display rooms at 212 N. Main St. This unit is under the direction of W. F. Friedrich.

CORRECTIONS IN LIST PRICES
OF MODELS SHOWN BELOW
MODEL 120 SHOULD BE $190.00
MODEL 110 SHOULD BE $108.50

"Instantly Cold at Bubbler"

a New Opportunity in the Hands of Refrigeration Dealers.

Units and Fixtures That Revolutionize Water Cooler Installations

◆ ◆

Now Ready for Delivery

◆ ◆

A vast extra market—among factories, institutions and offices . . . is opened by the TEMPRITE principle of direct cooling (liquid to liquid.) Now your compressors can be figured at 50% to 75% over normal ratings. Yet a TEMPRITE takes but half the usual space . . . and cuts first cost . . . installation cost . . . and service. Multiple or single installations under almost any conditions are made easy, practical and economical. A two-year guarantee of materials, workmanship and performance goes with each cooling unit. TEMPRITE construction assures correct temperature for every drink . . . since the jet is practically a part of the unit. Every drop is made "instantly cold at the bubbler."

Because of these radical advantages, the sale of water cooling can reach new heights.

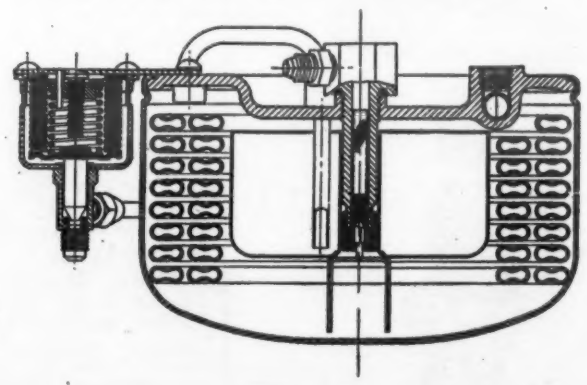
Certainly, TEMPRITE opens immediate sales opportunities . . . sales opportunities without season . . . sales opportunities that will bring greater revenue to the right refrigeration dealers accross the country.

Descriptive literature is ready for distribution. Liberal discounts, full co-operation, strong sales plan—*write for them now.*

Model No. 100
(S or M)
List $113.00
Two styles
Contains Unit complete

Model No. 120
(S or M)
List $108.50
Contains Unit complete

Model No. 110 (S or M)
List $190.00
Contains Unit complete

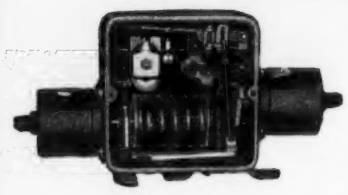


Liquid Cooler Corporation

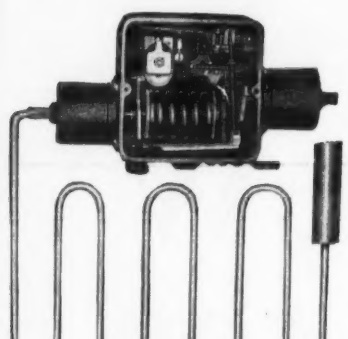
6527 RUSSELL STREET, DETROIT, MICHIGAN

Dual Control

the Penn Magnet Switch . . . *for temperature and pressure regulation with Safety Cutout*



Penn Dual Control
Open view type L S for pressure regulation.



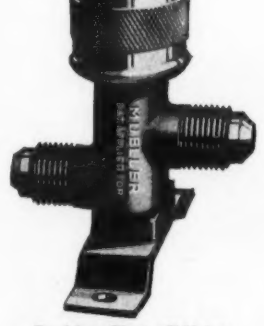
Penn Dual Control
Open view type L S T for temperature regulation.

Here is a highly perfected device that furnishes high pressure safety cut-out in addition to the regular temperature or pressure control, both in one compact unit.
An outstanding feature of this control is that the high pressure safety cut-out is entirely independent of the controlling mechanism. The high side of the control operates free of the low and adjustments in the low do not affect the high side.
The safety mechanism may be supplied to cut-out at any desired pressure up to and including 185 lbs. The low side range is from 20 inches vacuum to 30 lbs. pressure. The operating differential may be varied from a minimum of 1½ lbs. to a maximum of 25 lbs. Type L S controls employ the unique Penn Magnet Contact unusually sensitive to pressure and temperature changes, yet capable of handling loads up to and including 1½ Horse Power, Single Phase, Alternating Current Motors and 1 Horse Power Direct Current Motors at 110 or 220 volts.
By using the Penn Magnet Switch, manufacturers can eliminate automatic starters that have been necessary on motors from ½ to 1½ Horse Power. Dual controls may be used for both commercial and domestic refrigerators, multiple hook-ups and general commercial work. Remember, Penn Controls are listed as standard by Underwriters' Laboratories. Write today for complete information on these better switches and the Quickfreeze Attachment for cold control in electric refrigerators.

PENN ELECTRIC SWITCH CO.
DES MOINES, IOWA

An organization of proven engineering ability that supplies the largest and best concerns of the country with automatic control switches.

Mueller Forgings Are Vital to the Business Building of Refrigeration



Packless Shut-off Valve

WITHOUT forgings the mechanical refrigerating industry could not have progressed to the position of universal use it enjoys today.

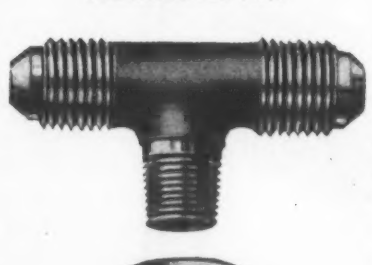
Castings, with their attendant porosity and flaws, cannot be used with any measure of safety. With forgings only can you be sure.

Mueller Refrigerating Fittings are forged under great pressure, are tremendously strong and have a dense, close grained structure. Seepage is impossible. Mueller Forged Valves and Fittings are your insurance against future trouble.

Mueller Brass Co. Valves and Fittings are approved by the Underwriters' Laboratories of Chicago.

We manufacture a complete line of valves and fittings and can supply your every requirement.

Flared Tube Side Outlet Shut-off Valve



Send us samples or blue prints for quotations.

Mueller Brass Co.
PORT HURON, MICHIGAN
THREE GENERATIONS OF BRASS MAKING.

SERVICE PROBLEMS

Some Interesting Developments in Commercial and Multiple Installations

By Frank W. Gray
Western Sales Manager, Absopure Refrigeration Corp.

THE developments in electric refrigeration equipment during the last few years have been principally along the lines of improved efficiency in cooling units, the elimination of service by proper installation methods, and ease of control over operation. Condensing units and fundamental principles are very much the same.

Much improvement has been made in the installation of apartment house multiple systems. The use of valves in multiple systems whereby different parts of the system may be isolated for repairs in case of leakage has greatly facilitated service work. The practice of installing apartment houses with separate risers all manifolded and valved above the condensing unit in the basement is now almost universally in use. With this system of installation any tier of apartments can be shut off by valves in the basement and a leak repaired without shutting down the entire system.

The use of conduit in multiple installations has also tended to increase the safety of these systems by protecting the soft copper tubing against damage which might cause leaks. In some localities refrigeration agencies have even gone so far as to provide hand control valves on each individual cooling unit in multiple systems so that the occupant of any apartment may turn off his own cooling unit as desired. This additional control, however, has disadvantages and makes the installation too expensive and complicated while not materially increasing its safety or efficiency. Most cooling coils have their own shut-off valves on both the high side and the low side, and the riser valves at the manifold above the condensing unit provide all the additional control that is needed.

An interesting automatic de-frosting device is being used to great advantage by some agencies on their multiple installations. This device consists merely of an electrical time switch, or torque clock, which operates electrically, requiring no winding, and which automatically cuts off the system for a few hours just after midnight, keeping all cooling coils on the system de-frosted and providing the maximum efficiency of refrigeration at all times. The writer has personally inspected a number of apartment houses which were de-frosted by this method, and has found that the cooling units were covered only by a thin skin of frost at all times. This practice also eliminates "back-frosting" and excessive running of the machine which is sometimes the result of coils being too heavily frosted.

Control Valves In Commercial Installation

One of the difficulties in the multiple installation of commercial equipment has always been the display counter. When large meat coolers and display counters are hooked up to the same machine, it is often difficult to accurately control the temperatures in the display counters where the heat leakage through the glass is greater than through the insulated walls of the meat cooler. A new packless shut-off valve is now on the market, with brass knob for manual control. This valve when placed in both the liquid and suction lines on the side of the display counter afford an easy method of turning off the refrigeration in the counter when not in use, or in case repairs are to be made. Also adjustments of the valve in the suction line give the butcher an opportunity of raising or lowering the temperature of his case. It is easily seen that with the flooded system universally used with such installations, an opening or closing of this packless valve in thesuction line would raise or lower the pressure in the boiler itself by increasing or decreasing the opening through which the gas must flow back to the compressor. This adjustment is working out very well in such installations, and may be used to advantage in many other applications of commercial multiple systems where accurate control of individual cooling units is required.

The Large Surface Cooling Unit

Another interesting development in electric refrigeration equipment this year has been the introduction of extra large surface cooling units which can be run at a higher temperature and which tend to decrease dehydration of foods. The evolution of commercial cooling units from the old brine tank to the modern fin type coil has shown the value of vertical surface area in correct air circulation and efficient cooling. Cooling coils are now being developed and marketed whose surface area is so large that efficient cooling can be accomplished by running them at a temperature so high that they merely sweat and scarcely frost at all. This is accomplished by providing a very large number of vertical fin surfaces. The tendency of this type of coil is to provide a slow and even air circulation, and to keep the humidity content of the air in the refrigerator very high. This type of coil may be operated off either the flooded or dry system, and portrays a radical change in cooling unit construction and efficiency.

Electric Device Records Machine Efficiency

For agencies who are interested in the operating efficiency of their equipment, and who wish to refute effectively any arguments to the contrary, an electrical recording device is now on the market which automatically charts the operation periods of a condensing unit over the twenty-four hour day. The value of such operation records can scarcely be overestimated. It provides the engineer with an effective check on his machine capacities under his own territorial heat conditions, and gives him conclusive proof with which to refute complaints of customers that their electric bills are too high, or that their machine runs all the time. Such records are particularly valuable in apartment house multiple installations or commercial installations where estimations of B. T. U. capacities and heat conditions are at the best only approximate.

Installation of High Buildings

The writer has come in contact during the past year with several instances of faulty installations in apartment buildings of twelve stories or over. These faulty installations were due to the failure of engineers to correctly estimate line loss in the running of their tubing for the multiple installation. It is impossible, of course, to lay down a rule for general use with all types of machines. A general observation, however, effectively covers the problem of high buildings. Be sure that you have sufficient liquid line capacity to carry the refrigerant to the top floors of the building, and be sure that you have sufficient suction line capacity to carry the vaporized refrigerant back to the condensing units. It is well not to place too many cooling units on one riser in an installation of this type. The condensing unit will naturally be operated at a higher head pressure in order to force the refrigerant to excessive heights—but even with this higher head pressure the liquid line must be large enough to carry an ample supply of refrigerant in spite of friction loss in transmission. One engineer installing an exceptionally high building in Los Angeles with a multiple installation used a double liquid line to advantage. One liquid line was teed off at each cooling unit, the other went straight to the top of the building and was looped into the end of the riser. The refrigerant used was sulphur dioxide. Exceptionally large suction lines should be used at least half way up the building in order to avoid a pressure drop on the low side of the system.

Another interesting development in the installation of multiple systems in high buildings is the use of receivers on the roof, thus reversing the system, with the liquid lines running down the risers and the suction lines running up. Factory engineers should be consulted before the agency not familiar with the peculiarities of such multiple installation work in high construction attempts to make such installations.

The Pressure Type Water Cooler

It is the writer's opinion that many electric refrigeration agencies have overlooked the tremendous field for the sale of water cooling installations for office buildings, industrial plants, and in many other places where cold water is needed for large numbers of workers. A pressure type water cooler has been developed for the market which is very effective for multiple installation use, and fairly easy to install. This cooler consists of a steel tank, in varying capacities, with the evaporator or "boiler" shell welded into the head. The tank is round, and is encased with heavy insulation which is also covered with steel and attractively painted. A port hole in the head of the casing provides an opening for the service or adjustment of the float valve. The head of the cooler is drilled with bolt holes for the float valve, either sulphur dioxide or methyl chloride, to be set in. Connections on the top and bottom are furnished for the water supply and waste lines. These pressure coolers may be installed in multiple on different floors or locations in large buildings, and are connected to a single condensing unit in the basement in much the same fashion as an apartment house multiple installation. A fin type cooling unit is used within the tank, so adjusted that freezing up is very rare. The units may be connected to bubblers or faucets, whichever may be desired. The entire system is easier to install than a circulating system, is lower in cost of operation, and is generally cheaper. Naturally, however, such an installation does not entirely take the place of the circulating system which for certain uses is very practical.

The control of multiple systems through valves, the increasing of efficiency in complicated installations, the general promotion of safety and ease of service characterize most of the developments in electric refrigeration this year. It is impossible in the space of this article to take up all of the novel inventions and short cuts in service and installation work which have come to the attention of the writer in his contact work with dealers in the field this year. Suffice to say, the standards of proper installation work are becoming much higher, and with the accummulation of practical experience has come a great decrease in service overhead.

REALTORS BOOST ELECTROLUX INSTALLATIONS IN ADS

Rodman and English Building Corporation, Hollis, N. J., have installed Electrolux gas refrigerators in all the homes in their new Hollis Crest and Addisleigh developments, and are featuring them in elaborate broadsides and mailing pieces. These new developments are just outside of Jamaica, N. Y. The installations were made by the Brooklyn Union Gas Company.

MANAGEMENT PROBLEMS

Budget Control For Refrigeration Dealers

By H. E. Burns, Servel, Inc.

A SOUND economic budget of operations is the alarm clock of a business. It can be likened to the nervous system of a human being; its nerve arteries being the different elements of income and expense.

In their small business, our forefathers kept records on what we term "day books"—did not even use ledgers. In those days business was confined to a small area, usually one small community, where everyone was known personally by the shopkeeper. As the population of the country grew business methods necessarily had to keep pace with that growth and today when commerce covers the world it is vitally necessary that a concern which expects to stay in business must forecast scientifically and economically, not only its income, but its expenses, so that the volume obtained will enable it to meet its obligations and yet have something left over for dividends, surplus, and capital expenditures.

Different Kinds of Budgets

A budget may be called any other name as long as the idea of a scientific forecast of operations is carried out. There are different kinds of budgets, the most common one in use a budget of sales and expenses which can be carried on further into a budget of cash receipts and disbursements, manufacturing budget, budget of purchases and can even be carried into the balance sheet proper. There is also the household budget and the budget of time and operations of departments within a business.

In this article an attempt will be made to describe the operating budget, or, in other words, the budget of income and expenses as pertaining to refrigeration dealers.

Accounting, as such, is sometimes looked upon by business men as a burden of expense. This may be so, but where would business be today without scientific accounting methods? And no accounting system will be of any material benefit to a company until they supplement their accounting system with a scientific and economic budget of operations.

An operating budget, when properly prepared will show by months the estimated sales by models, cost of sales by models (cost of merchandise), every element of expense and the net profit or loss for each month.

It is generally conceded that the months of January and February will show losses in the refrigeration business. A common error is frequently made in that an estimate of net profit to be realized during a given year is divided by the periods in the year, whether it be twelve months, quarterly or semi-annually, and then when the profit and loss statement has been prepared for that period and does not come up to expectations the executives of the business are unable to put their finger on the cause of the loss or decrease in profits.

An operating budget, if set up at the beginning of the year, will not only show the months in which losses will be sustained but will show the months in this loss will be made up by additional profits, will enable the company to more economically place the purchase orders on the manufacturer, determine the amount of cash expected to be realized and the amounts of cash that must be expended in any one month.

At the close of each month, assuming that the books are closed monthly, and are kept on a double entry system, amortizing depreciation, insurance and deferred items over a period of time, a comparison of the actual operations with the budgeted operations will show exactly where either sales did not come up to expectations, merchandise cost too much, or general overhead expenses were too high. The company will then be in a position to correct those errors in the month succeeding the one upon which the statement is made, rather than continue over the year without knowledge of the errors.

For the company without any experience in refrigeration, or any other business for that matter, who takes on refrigeration exclusively, a budget is very essential. With that dealer who has no experience upon which to draw for a future set up, apparently must go about it blindly, but this is not true, for if he will in the beginning set down monthly the amount of expenses which actually must have to be met, such as rent, clerical salaries, salesmen's salaries, insurance, light, heat, telephone, etc., and will divide this amount by twenty-five per cent, the average ratio of overhead expenses to sales volume, he will know approximately what volume of business he must do in order to meet his obligations.

I have in mind a business operating for several months. The partners, without any experience in the business whatever, reminded me of the man who decided to go into business for himself and borrowed the money to do so. He immediately accepted a job without giving thought of what the job would cost him. When he had finished he found that he had not enough money with which to pay his helpers, let alone any profit left for himself.

These partners which I mentioned above asked that a budget of operations be prepared for them to cover the balance of their accounting year. At the time of preparing this budget they had used all their available cash for expenditures and had to mortgage their inventory to enable them to stay in business.

The budget was prepared, using the maximum amount of expenses which they would incur during the year and on the least possible amount of business which they could do in order to meet those expenses. The first thing this budget showed them was that it would be necessary for them to have more capital in their business.

It also showed them that they had been operating on the wrong plan entirely and that their conception of stepping into a business and immediately making a profit with very small capital expenditure was wrong.

This budget put them into an entirely different frame of mind, "pepped" them up as it were, and by the use of it they were able to obtain additional capital in their business, and today they bid fair to succeed and become a successful refrigeration dealer.

Benefits from Use of Budget

Benefits to be derived from the use of a budget are many, as a company doing an international business discovered after they had operated for a number of years. They had plenty of capital in the early periods of operation, and did not watch expenditures closely until one day it was necessary to enter upon a strict retrenchment or go out of business entirely. A radical change was made in their affairs, and a strict economic budget on a sound basis was put into effect with a competent man in control of the budget. Today the business ranks among the first as being one of the strongest and soundly financial of the businesses in this country.

It is surprising to know how few small concerns operate on the budget plan, but it is only stranger to realize how few of the larger corporations use the budget plan. It is gratifying to learn, however, that business in general is realizing more and more the importance of a budget, as one gentleman termed it not long ago, "a very necessary evil" in the operations of their affairs.

This article will next take up the preparation of a budget for an average refrigeration dealer, and while the figures used are hypothetical, they are based on an average of actual operations. The set-up to be described is for a company that is new and has had no previous experience upon which to draw, although the same method can be followed in any event.

The first step in setting up this operating budget is to determine the total amount of fixed expenses for the period. In this article we will consider a period of one year, but conditions may be such that a shorter period will be desirable.

The fixed expenses consist of salaries of executives and clerks, rent, telephone and telegraph, stationery and office supplies, postage, heat, light and water, insurance, depreciation and sundries, and we will consider that they total $30,000.00 for the year.

Dividing the total of fixed expenses by fifteen per cent, the average ratio which these expenses should bear to net sales, we get the total of $200,000.00, or the volume we must obtain in order to meet our expenses.

The next step is to determine the number of units which will obtain that volume of sales, and as there are different models at different prices, the following basis is used to determine the average selling price per model:

Considering that we have five models in our display, and statistics tell us that these models do not move in an even ratio, we will use the following basis for our calculations:

Model A	8×$215.00 selling price=	$1,720.00
Model B	7×$245.00 selling price=	1,715.00
Model C	3×$275.00 selling price=	825.00
Model D	1×$305.00 selling price=	305.00
Model E	1×$325.00 selling price=	325.00
Total expense	$69,000.00	34.5%

$4,890.00 ÷ 20 = $244.50, average selling price.

$200,000.00 ÷ $244.50 = 818 models to be set up as a budgeted sales estimate.

Breaking the total units to be sold into the basis above, we arrive at our total estimated sales for the year.

	Model	Price	Amount
Model A	40%=327×	$215.00=	$ 70,305.00
Model B	35%=286×	$245.00=	70,070.00
Model C	15%=123×	$275.00=	33,825.00
Model D	5%= 41×	$305.00=	12,505.00
Model E	5%= 41×	$325.00=	13,325.00
Total—100%=818			$200,030.00

The next and final step in the sales estimate for the year is to put the annual figures on a monthly basis. The average percentages which we will use are:

January	3 per cent
February	5 per cent
March	8 per cent
April	12 per cent
May	20 per cent
June	20 per cent
July	10 per cent
August	8 per cent
September	6 per cent
October	3 per cent
November	2 per cent
December	3 per cent
	100 per cent

(Concluded on Page 20)

E. T. L. Service for Domestic and Commercial Electric Refrigeration

Testing and experimental laboratory service for Manufacturer, Distributor, Central Station — Test data exclusive property of client

ELECTRICAL TESTING LABORATORIES

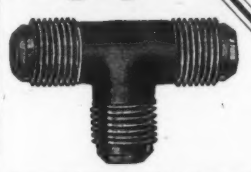
80th Street and East End Avenue, NEW YORK CITY, N. Y.

Three Aids To Better Joints

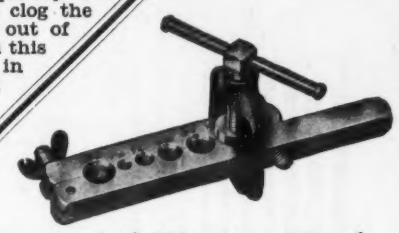
Imperial Tube Cutter

Here is a highly efficient tool for cutting copper, brass, block tin and lead tubing. It takes all sizes of tubing from ⅛" to ⅝" and makes a right-angle cut, quickly and cleanly, leaving no burrs or chips to clog the line. The tubing does not become out of round as when put in a vise. When this tool is used, tubing can be cut in half the time required by old methods and a far better job results. No. 94-F Tube Cutter, each $2.50

Brass Forgings



Accurately made to meet all the requirements of Iceless Refrigerator Manufacturers. Will not leak. Let us quote on your requirements.



Imperial Flaring Tool

The Imperial Flaring Tool gives the proper flare and taper to the tubing for making up joints. A perfect flare means a tight joint, and this tool does the work in the least time and with the utmost simplicity. No loose dies—no vise necessary.

No. 93-F takes tubing sizes 7/16", 3/16", 1/4", 5/16", 3/8", and 1/2", each $3.00

No. 95-F takes tubing sizes 1/4", 5/16", 3/8", 1/2" and 5/8", each $4.00

IMPERIAL BRASS MFG. CO., 565 So. Racine Ave., Chicago, Ill.

Make Every Season A Profit Season . . . *With* SILENT GLOW OIL BURNERS

IN THE slow months, when your electrical refrigerator sales are slack—that's the time to fill out your line. The dull season is here right now. But *you* can make it profitable by filling out your line with Silent Glow Oil Burners. For this is the oil burner season. This is the time to make money. And with Silent Glow you can make it. These guaranteed products have been on the market six years, giving dependable service to 50,000 satisfied users, winning new friends every day.

We have just completed arrangements for the warehousing and distribution of our products in the Metropolitan New York area and its environs through the *K-W Corporation.* They will act as our distributors for our entire line which, due to the growth of our business and the addition of new products, has been divided into these groups:

Power Burners

consisting of

"Sunflower Line" for bungalow and residences.

"D'Elia Line" for apartments, business blocks, public and industrial buildings.

Silent Glow Burners

For kitchen, restaurant and hotel ranges.

Oil Heaters for residences and garages.

Hot Water Heaters, Cabinet Heaters and Oil Ranges.

THE Silent Glow line not only complements your present line—it offers you a complete range of oil heating devices for every heating need—from smallest cottage to apartments and large buildings.

See these famous burners today on display in the showrooms of the

K–W CORPORATION

SUITE 506, HUDSON TERMINAL BLDG.

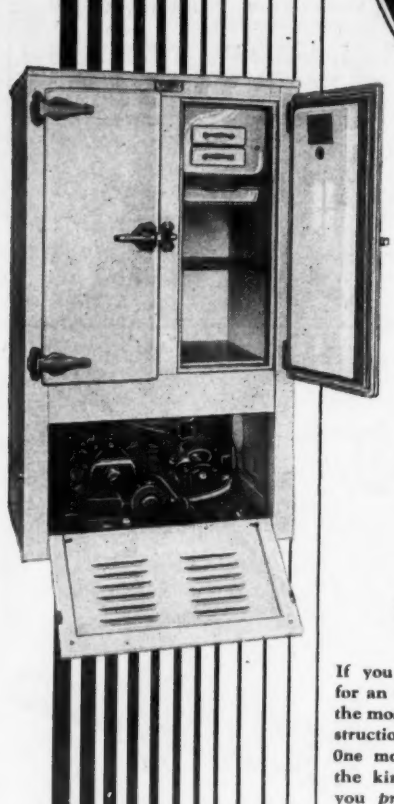
30 CHURCH STREET, NEW YORK (*Phone Cortland 4733*)

or at Booth 92, Electrical Show, Grand Central Palace, October 7-12, 1929

Dealers outside of the greater New York territory, please communicate with the main office of

The SILENT GLOW OIL BURNER CORPORATION

HARTFORD, CONN.



Wayne
ELECTRIC
REFRIGERATOR

Now You Can Double Your Sales!

YES—you can double and even triple your sales with the new, complete line of WAYNE ELECTRIC REFRIGERATORS—each with automatic cold control—a size, style and color for every home.

AND—the separate refrigerating units (two sizes) that can easily and quickly be installed in any refrigerator!

Perhaps you would like to know more about this new complete line? Just drop us a line!

and Oil Burners

If you are looking for an oil burner of the most simple construction—with only One moving shaft—the kind that gives you *profits*—instead of service costs—there is only one—and it's a WAYNE!

WAYNE HOME EQUIPMENT CO.
Fort Wayne, Indiana

Little Motors ◆ Big Performance

The motored appliance is invading the home...raising the performance standard fo small motors. Wagner has pioneed in the improvement of small-motor erformance...increasing quietness, ficiency and power-factor . . . decreasing bearing and other service troubles. Check your motor with up-to-date Wagner performance.

Wagner, Quality

Consult Wagner, because Wagner builds every commercial type of a.c. motor.

Literature on Request

WAGNER ELECTRIC CORPORATION

6400 Plymouth Ave., St. Louis

Sales and Service in 25 Cities

PRODUCTS . . . FANS: DESK, WALL, CEILING
TRANSFORMERS: POWER, DISTRIBUTION, INSTRUMENT
MOTORS: SINGLE-PHASE, POLYPHASE, DIRECT CURRENT

61-7532-1

BUDGET CONTROL FOR REFRIGERATION DEALERS

(Concluded from Page 19)

Cost of the merchandise must now be computed and for the year, including freight, this will be $113,105.00, as follows:

Model A—327 Models × $120.00 f. o. b. Salesroom		$ 39,240.00
Model B—286 Models × $140.00 f. o. b. Salesroom		40,040.00
Model C—123 Models × $155.00 f. o. b. Salesroom		19,065.00
Model D— 41 Models × $175.00 f. o. b. Salesroom		7,175.00
Model E— 41 Models × $185.00 f. o. b. Salesroom		7,585.00
Total		$113,105.00

The cost of merchandise must also be reduced to a monthly basis to conform with the sales estimate.

Our Budget for the year now shows:	
Estimated total sales	$200,030.00
Estimated cost of sales (including freight)	113,105.00
Estimated gross profit	$86,925.00

Advertising expense is difficult to estimate, as there is no set rule for the estimate basis. Some concerns use the set amount per unit of sale; others appropriate a certain percentage of the dollar volume, and still others appropriate a flat sum regardless of unit or dollar volume. In this article we will use an average of five per cent of dollar volume, which will give us $10,000.00 to expend for advertising, and this amount should be distributed over the year at the rate of five per cent on each month's sales estimate.

We have considered in this set-up that the units are sold including a charge for servicing, and therefore our service expense will increase our fixed general expenses which are analyzed as follows:

General:	
Salaries of Executives	$10,000.00
Clerical Salaries	7,700.00
Rent	4,500.00
Telephone and Telegraph	1,000.00
Stationery and Office Supplies	850.00
Postage	350.00
Heat, Light and Water	950.00
Insurance	2,500.00
Depreciation	1,000.00
Sundries	1,200.00
Total	$30,000.00
Service:	
Salaries	$6,000.00
Automobile and Delivery expense	2,000.00
Materials (Service Parts)	1,000.00
	9,000.00
Total Overhead Expense (exclusive of Salesmen's Commissions)	$39,000.00

We have now taken into consideration all expenses with the exception of salesmen's compensation, which we will consider on a basis of a straight ten per cent average commission, and which would amount to $20,000.00.

These expenses also should be apportioned on a monthly basis, all being on one-twelfth of the total except Advertising and Salesmen's Commission, which would be governed by the net sales for the month.

Our Budget now stands as follows for the year:

	Amount	Percentage to Net Sales
Net Sales	$200,030.00	100.0%
Cost of Merchandise	113,105.00	56.5%
Gross Profit	86,925.00	43.5%
Expenses:		
Commissions	20,000.00	10.0%
Advertising	10,000.00	5.0%
Service	9,000.00	4.5%
General Overhead	30,000.00	15.0%
Total expense	$59,000.00	34.5%
Estimated Net Profit for the Year	$17,925.00	9.0%

A budget of operations is of no avail unless the actual figures are compared with the estimated. To this end it is recommended that a report be compiled monthly, giving these comparisons and somewhat like the following:

COMPARATIVE STATEMENT—BUDGETED VS. ACTUAL INCOME AND EXPENSE, MONTH OF JANUARY, 1929

	Budgeted		Actual		Increase (Decrease)	
Net sales	$6,000.90	100.0%	$4,867.31	100.0%	($1,133.59)	-0-%
Cost of merchandise	3,393.15	56.5%	2,592.61	53.3%	(800.54)	(3.2%)
Gross profit	2,607.75	43.5%	2,274.70	46.7%	(333.05)	(3.2%
Expenses:						
Commissions	600.09	10.0%	486.73	10.0%	(113.36)	-0-%
Advertising	300.05	5.0%	434.44	8.9%	134.39	3.9%
Service	750.00	12.5%	800.00	16.4%	50.00	3.9%
General Overhead	2,500.00	41.8%	2,280.67	46.9%	(219.33)	5.1%
Total expenses	4,150.14	69.3%	4,001.84	82.2%	(148.30	12.9%
Net Profit (Loss)	($1,552.39)	(25.8%)	($1,727.14)	(35.5%)	($ 174.75)	9.7%

It will be seen that in the foregoing comparative statement that percentages are set beside the amounts and show that while expenses decreased in value, the ratio of expenses to net sales is greater by 12.9% due to a greater reduction in net sales than in expenses.

While it will not be discussed in this article, the operating budget can be made the basis of a budget of estimated cash receipts and disbursements.

Inventories, also, can be budgeted by following actual unit sales with statistical records and the maintenance of a perpetual inventory, embodying therein units on hand, on order from the factory and estimated sales.

The foregoing discussion and analysis is for a general budget, but this may be divided into departments, giving each department its proportion of the budget. When this is done, however, the accounting records must be maintained on the same basis and the expense of doing so often is found prohibitive in a small business.

Before closing this article I wish to say a word about salesmen's quotas. It is wise to assign a definite requirement, known as a quota, to each salesman, and advise him periodically of his performance ratio to his quota. To do this a simple record can be kept. One refrigeration dealer combines his sales analysis with cost of the merchandise and commission record by salesmen's names, and while it is not complicated, is necessarily a rather wide book when open. This particular dealer employs his salesmen on a strictly commission basis, estimating each man's quota on an earning power to him of $300.00 per month, or $3,000.00 in business to the dealer at ten per cent.

It is also a good idea to prepare graphic charts of the estimated sales and various expenses throughout the year by months, placing thereon as the months pass the actual, which will give give a quicker picture of the operations than reading the figures. An illustration of the budget as outlined in this article on a chart basis is appended hereto.

Sparklets Booth Attracts Delegates

Sparklets booth at the Annual Home Economics Association convention in Boston, July 2-5. The demonstrations were viewed by the two thousand delegates present.

WELDING PROCESSES HAVE BEEN HELPED BY RESEARCH WORK

By Dr. W. R. Whitney, Vice-President and Director of Research, General Electric Company

THE development of the electric refrigerator shows how research and the recording of trivial phenomena may lead to valuable results at a later date.

For example: two new methods of welding which are used in the manufacture of refrigerators and which were developed in the Research Laboratory, came into being in a manner quite typical of industrial research. That is, they were not primarily due to direct research for the need, but to discovery through observation. Many such discoveries come through experimental work which could scarcely be produced by deliberation.

The use of hydrogen-copper brazing and the atomic hydrogen arc welding were two items recognized, recorded and used for minor purposes, but they had not been needed technically. When electric refrigerators were manufactured by our company, these two methods of welding were already tested and available. When I think of co-ordinated research I always like to think of the welded joints in the triple cocentric containers which form the substitute for the ice cakes, the so-called evaporator inside the refrigerator box. The front edge of the open cubicle is a three-ply welded joint, where three separate boxes of sheet iron are sealed one within the other. This welded edge had to be stiff and strong and thick enough to hold permanently the mineral enamel which covers it. It had to be solid enough so that contraction and expansion of the parts will not produce appreciable yielding, and thus crack the enamel. It must be smooth and clean. It must never leak a trace of the high pressure gas behind it, nor let gas and water intermingle around the intermediate barrier. In this small area of edge representing about an inch of material, advance research and observation played a part.

An incident which led Dr. W. D. Coolidge to use copper as a means of sticking together various metals such as tungsten and iron, happened years ago. When the first squirted tungsten filaments were being made, they were preheated on iron gauze boats in hydrogen gas. One of the research men once attached a copper wire to one of these boats, although iron wire had been previously used for withdrawing it from the furnace. In this case, the copper melted but this did not surprise the research man, as the temperature was above the melting point of copper. But something peculiar took place. The wires of the gauze boat were now bright with a clean coating of copper, which had spread with remarkable ease for long distances along the individual iron wires. This peculiarity was tested for its possibilities, and it was found easy to copperplate large iron surfaces by very small quantities of copper, because it spread so easily, and because it penetrated the capillary openings. This was then developed by Messrs. Palmer and Steenstrup into a commercial process for steel brazing, which was easily applied to turbine labyrinths and steam plates and finally to the refrigerator. Copper, however, is only part of the evaporator seal just described and copper brazing alone would not be good enough for surfaces over which enamel is spread, as such surfaces should be homogeneous. Atomic hydrogen welding is the other part.

Atomic welding was developed from the vacuum lamp. Dr. I. Langmuir studied certain reactions which took place on the inside walls of blackened lamps. He also noticed the decomposition of traces of water vapor which came into the vacuum from the glass. Connecting these in his mind, his research work led to the assumption that hydrogen atoms as distinct from molecules were exceedingly active. They could be produced in the electric arc—they could raise the temperature of metals exceedingly high, even to the melting point of tungsten itself. This led to the study of arc welding metals by use of tungsten electrodes within a hydrogen atmosphere and hence to atomic welding torches. The difficulties of ordinary electric welding, due to the occasional inclusion of slag or oxide within the welding joint, were removed and the finished surface of the joint thus became suitable for enameling.

Hydrogen copper brazing and atomic hydrogen arc welding work out exceptionally well in such cases as the General Electric refrigerating unit, where any possibility of leak must be removed.

These two illustrations picked from the cold interior of the electric refrigerator point to the value of co-ordinated research.

PUBLIC UTILITY NEWS

CHEAPER ELECTRICITY WILL RAISE DEMAND SAYS N.E.L.A. HEAD

N. E. L. A. President Sees Need for Readjustment of Rates

"The big job before the electrical industry is to sell more electricity for less money," Matthew S. Sloan, president of the New York Edison Company and affiliated companies, and president of the National Electric Light Association, told the New England Geographic Division of the National Electric Light Association at its convention at New London, Conn., September 9, 1929. Mr. Sloan said:

"Since mergers of operating companies and extension of holding company participation in utility development is one means of obtaining lowered costs, the utilities must justify mergers in the public's mind by rate reductions. The usefulness of our companies must be increased year by year if we are adequate to our job. They must do their part in electrifying the American home, as they have electrified the American factory, so that the American woman may not have to toil as her husband, working under modern conditions, would refuse to do. Our companies must bring America to the point so glowingly predicted by Mr. Ford, and nobody knows better than we that that is our ambition and our ideal.

"We of the industry are bound with Mr. Ford to hope for the time when it will be cheaper to use electricity than not to use it, when our country will be completely electrified. We can understand better than most people what that would mean in human drudgery saved, in economy and efficiency gained, in standards of living raised beyond their present high levels. We are bound to work for the realization of this vision, because it will come to pass more through our efforts than by any other means. We have a long way to go, and the journey will be none too easy. What has been done in the life of the power and light industry, however—less than fifty years—is a measure of what we shall be able to do in the future.

"The homes of the country today are approximately 70 per cent electrified. The factories are 50 per cent electrified or better, that is, by central service. However, it has been estimated that on the average the urban home uses only one-fifth the electricity which could profitably be employed. Also there are five or six million farms which have no electric service, and the half million farms now on the lines of the central stations are using very much less current than they could profitably put to work.

"If complete electrification of our nation's homes is to be brought about, the power and light companies have ahead of them a selling job worthy of their very best efforts on a long-continued basis.

"One very important part of our sales effort, I believe, will be the form of rate schedules in effect. We must literally make it cheaper to use electricity than not to use it. We must get the price of electricity in the quantity necessary for a thoroughly equipped electrical home down to a figure which would make the housewife see how uneconomical it would be to spend her time and strength on tasks which electricity could do better, quicker and at such small cost. Our industry has already gone far in bringing down domestic rates, and many companies have adopted rate schedules specifically intended to promote large use of service by lowering the price as the quantity used increases. The success of such selling of service, both from the point of view of the customer and of the company, commends it to the serious consideration of all companies which have not adopted it."

ELECTRIC REFRIGERATION HAS DOMINANT PLACE IN PUBLIC UTILITY POLICY

That electric refrigeration has achieved the dominant position in the load building activities of electric light and power companies is indicated by an editorial in *Electrical World*, September 14, 1929, which complains that central station sales departments have long had a tendency to concentrate their energy on one appliance at a time. "Refrigeration is the present idea," according to the editorial, which reads as follows:

"Must Sales Departments Always Play the Fad?

"It has been the history of power-company commercial development that the fad of the season has always dominated selling. Time after time, as new popular merchandise has come along, it has been a case of off with the old love and on with the new. Away back yonder flatirons were dropped by the enthusiastic sales crews when the intriguing vacuum cleaner appeared. The cleaner was sidetracked for the clothes washer—and so on. Instead of putting added pressure and more man power on the broadened line, attention each time has been very largely transferred to the appealing innovation as if it were impossible for a central-station sales department to sell energetically more than one thing at a time.

"Right now power-company sales of clothes washers and other small motor-driven appliances are being much reduced by the intense eagerness of these utility sales departments to sell refrigeration. They quite properly desire more domestic load. Refrigerators provide more load than washers, so why bother with this small-income stuff? Refrigeration is the present idea.

"But, unfortunately, this kind of thinking is not only selfish but short-sighted. It disregards the interest of the household that the utility is obligated to serve. The power company wants load—yes. But the family at home wants all kinds of relief from drudgery and many kinds of comfort. Its members want and are entitled to, not just refrigeration, but a balanced electric service, one possible only with a complete electrical equipment. And if the power company is sincerely trying to promote a larger dependence upon electricity in family life, it must get the customers' viewpoint and see that the small-income appliance is not neglected. The value of an appliance to the public has nothing to do with load or vice versa—but in the long run the interest is obviously mutual.

"Why can't the industry sell everything electrical at once? Why must it always play the fad of the hour?"

THE PUBLIC UTILITY AND THE DEALER

IN every other business, aside from the electrical one, we have but three factors with which to deal, namely, the manufacturer, the distributor and the dealer. In the appliance business we have another and that is the public utility, and therein lies the joker. It has a guaranteed existence plus a power load for revenue which the independent dealer does not have. If the utility companies are big enough to be fair in their merchandising methods, then they are a wonderful asset to the merchandising of appliances in their respective communities. On the other hand, if they are unfair in their merchandising practices and ethical standards of doing business, they are a detriment to the industry in general in the merchandising of appliances and the independent dealers are at their mercy.

—John E. Herman
H-L Electric Company
Greensburg, Pa.

EDUCATIONAL BUREAU INCREASES UTILITY REFRIGERATION SALES

Brooklyn—The Home Economics Bureau of the Brooklyn Edison Co. has been in operation for four years and has established a respected place for itself among women of all sections of Brooklyn for its helpful dissemination of information on housekeeping problems, and its delightful entertainment of their club groups.

The work of this bureau is strictly educational. No direct selling is ever done in its meetings or demonstrations, nor are the women present ever followed up by personal or telephone solicitations. The only follow-up work is in the sending of advertising material occasionally and the regular notices of demonstration meetings in the Home Economics Bureau in their neighborhood. At the head of this Bureau is Miss Florence Freer, an expert in domestic science work, who has under her a staff of several assistants trained in this line.

The principal demonstration room is in the main office at Pearl and Willoughby Streets, but six of the branch offices now have demonstration rooms. In the Coney Island office on Surf Avenue, just off the Boardwalk, there is a well equipped electrical kitchen with a permanent representative of the Home Economics Bureau to explain the workings of electrical appliances and to conduct demonstrations and lectures. A larger space is being allotted to this work on the street floor of the main office this year, where there will be an electrical apartment. The largest number of meetings are held in the main showroom and draw more attendance because of the location in the shopping district close by large department stores.

Frigidaire and Kelvinator are the two makes of electric refrigerators carried here. Both are demonstrated and recommended. The basic idea in their work is to sell the *idea of electric refrigeration* first, not to sell any one particular make. If a woman comes up after the lecture to ask which is the better make, the lecturer is instructed to tell her that she should see both and make her own decision. She will say, "This happens to be a Kelvinator I am using, but if you go upstairs you will see the Frigidaire," or the other way around, according to which refrigerator happens to be in use. The demonstration meetings of this Bureau are for the benefit of the sales of all kinds of electric appliances, and the electric refrigerator shares with electric ranges, washers, ironers, etc., in the publicity brought before thousands of women yearly in this happy way.

TWO GEORGIA POWER MEN MAKE HONOR CLUB

Atlanta, Ga.—Two more salesmen have become eligible to apply for membership in the Georgia Power "Look Er Here" Club, which is composed of the topnotchers. E. F. Champion, commercial sales section, Atlanta, Ga., sold 100 G. E. bottle coolers to the Benscott Mineral Springs Co., Austell, Ga. The sale was concluded in one day and amounted to $17,590.

The other new applicant is Sidney Lanier, Thomson district, who has made two combination sales totaling $941.10, consisting of refrigerators and electric ranges.

Refrigerators Lead Providence, R. I., Utility Sales in Dollar Value

A new sales record for electrical appliances for the six months ending June 30, 1929, has been made by the Narragansett Electric Co., of Providence, R. I. A total of 871 refrigerators were sold during this period, bringing in a sum of $250,410.78.

An analysis of the following table shows that although the smaller electrical appliances were sold, and in far greater numbers, the value of the refrigerators sold was greater than any other group. Furthermore, the estimated annual kilowatt hours which will be used by the appliances sold is greater for refrigerators than for any other appliance.

	No.	Amount	Est. Annual Consumption Kw-hr.
Ranges	339	$ 57,161.79	510,000
Refrigerators	871	250,410.78	705,000
Water Heaters	23	2,273.89	69,000
Ironers—Electric Heated	175	13,740.53	63,000
Flat Irons	6439	38,392.21	463,608
Electric Space Heaters	379	2,313.68	36,384
Percolators	2077	16,053.22	87,234
Toasters	2541	15,192.53	94,017
Cookers	1560	12,530.76	31,200
Vacuum Cleaners	1514	64,509.06	40,878
Washing Machines	1585	163,233.27	39,625
Waffle Irons	1781	14,659.06	53,430
Grills and Table Stoves	1036	4,590.93	31,080
Curling Irons	284	631.60	1,420
Electric Fans	752	10,547.17	12,048
Heating Pads	1017	6,404.17	15,255
Floor and Table Lamps	1805	13,424.09	108,300
Mazda Lamps		86,817.98	520,908
Heavy Duty Installation			199,200
Miscellaneous Merchandise		41,819.40	44,319

The prospective buyer of a cabinet "knows" that corkboard is the best insulation.

You must "sell" him on any other kind.

Why increase the sales resistance?

Write for copy of Bulletin 280-D

Novoid Corkboard Insulation

CORK IMPORT CORPORATION 345 W. 40TH ST. NEW YORK

"Permanent Protection for All Refrigeration"

Visit Our Booth at the Dairy Show in Toronto

for there's a

TIME-O-STAT

Distributor near you!

TIME-O-STAT Distributors now number 25—located in principal cities of the United States and Canada—serving Time-O-Stat Dealers and their customers efficiently and well.

Dealers will find a convenient and complete line of Time-O-Stat products stocked by each Distributor. They will find him ready and willing to give cheerful service and helpful cooperation at all times, to all dealers.

Users of automatic controls are quick to appreciate cheerful intelligent service, and that's just what the Time-O-Stat Distributor offers you . . . and by the way have you noticed the completeness of our line of controls (listed below)? . . . just write today for catalog of the products which interest you!

Exclusive* TIME-O-STAT *Service

Factory Sales and Service Offices
Boston, Mass.
Chicago, Illinois
Detroit, Michigan
Elkhart, Indiana
Kansas City, Mo.
New York, N. Y.

Exclusive Distributors
Baltimore, Maryland
Birmingham, Alabama
Buffalo, New York
Chicago, Illinois
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Denver, Colorado
Los Angeles, California
Milwaukee, Wisconsin
Minneapolis, Minn.
Newark, New Jersey
New York, New York
Oklahoma City, Okla.
Omaha, Nebraska
Philadelphia, Penn.
Pittsburgh, Penn.
St. Louis, Missouri
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Successor to:
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Manufacturers of AUTOMATIC CONTROLS for Oil Burners • Gas Burners • Coal Burners • Electric Refrigerators • Furnace Fans • Mechanical Stokers • Industrial Ovens • Ice Machines • Unit Heaters • • • Also of Sign Flashers • Mercury Switches • Electric Heaters • Corrugated Metal Bellows

Seepage Proof
Tube Fittings
We make a complete line of pipe and tube fittings for automatic refrigeration.
Send for Catalog No. 36
"Built Right--to Stay Tight"
Commonwealth Brass Corporation
COMMONWEALTH AVE. AND G.T.R.R.
DETROIT, MICHIGAN.

precision built MOTOR, TRANSMISSION, ECCENTRIC and CRANK SHAFTS

MADE TO YOUR SPECIFICATIONS. SEND US YOUR BLUE PRINT — WE WILL SEND YOU OUR PRICES.

MODERN MACHINE WORKS, INC.
196 MILWAUKEE STREET, MILWAUKEE, WISCONSIN

Seamless
Copper Tubing
Specially Tested and Dehydrated for Refrigeration Work

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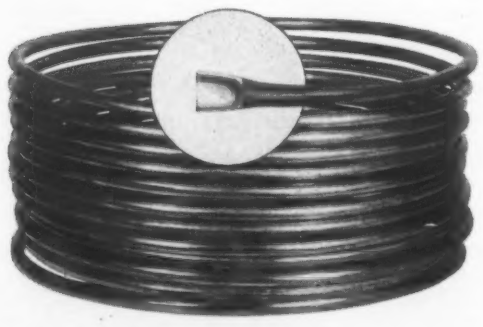
Made to A. S. T. M. Specifications (B 68-27T)
Quick Delivery



Our model plant covers five acres—our organization is above par—our products stand in a class alone.

We Want To Quote Where Quality Counts

WOLVERINE TUBE CO.
SEAMLESS COPPER BRASS & ALUMINUM

1431 Central Ave., Detroit, Mich.
Phone Cedar 5000

Sales offices in all major cities. Write or phone for name of nearest representative.

SELLING METHODS

PLAN TO ROUND UP THE "LAST MINUTE" CHRISTMAS SHOPPER

By Elaine Dean-Tinis

AROUND Christmas time there are too many men who are "too busy" to shop around for gifts for the family. They know that they have to get something, but what sort of "something" to get, they don't know. They remain undecided about their holiday gifts until the last minute, and then, true to masculine form, they often make purchases for which the family has no use.

Dealers should get after these "busy" men. Electric refrigerator salesmen should plant firmly in their minds the idea of practical gifts which would benefit the whole family.

In many homes the real need for a refrigerator is not realized. Most home managers, of course, would like to have all of the modern labor-saving appliances, but hesitate to approach their husbands on the subject, because the price factor looms large. Instead, they prefer to burn up their energy and risk their health on some task, rather than purchase an electric device which would do it for a few cents and with a fractional amount of effort on their part. This is because few women place any actual dollars and cents value on their time. They just don't figure costs in terms of time or inconvenience. So much hard work done by hand is so much money saved.

A recent investigation brought to light that among the women interviewed, 50 per cent had not bought electrical appliances because of the initial cost, and 16 per cent had not bought electrical appliances because of the cost of operating current.

It wasn't that these women didn't want the task of housekeeping made lighter, understand, but they reflected as they pushed the broom instead of the vacuum cleaner, that it only took a little more time to do it this way, but what of it; they were saving money and therefore a big help to their husbands.

Of course, all women don't feel this way about it, and it is a good thing for electrical appliance salesmen that they don't. Due to the educational work of manufacturers, women are becoming educated to the fact that electrical equipment in the home pays in dollars, time and energy saved. The women thus educated want labor-saving devices and make plans to buy them. In some cases they help the salesman in selling the husband on the need and economy. But where both husband and wife see the need and advantages of electrical equipment, and where the wife wants the equipment but feels that she ought to postpone the purchase until "some other time"—it is a wise husband who buys his wife the very thing she has been wanting.

Every devoted and considerate husband wants to provide for his wife the things that will simplify her task of housekeeping. He wants to buy worthwhile things for the home, only he hasn't the time to shop around, and in some cases, feels that he can't afford the expenditure.

Whatever the case may be, Christmas time is when the old spirit of giving takes hold of friend husband. He wants to give something magnanimous, something that will keep—a worthwhile investment. Here the electric refrigerator dealer can be of real help. He can bring to the attention of the husband the gift that his wife wants and the family certainly needs—the electric refrigerator. By pointing out the advantages of an electric refrigerator, the health features, economy and ease with which it can be purchased, the dealer can secure many Christmas dollars which would otherwise be spent foolishly by many a husband in distress.

G. E. Plans Christmas Campaign To Men Only

The General Electric Co., working on the theory that the busy man who is wondering what to buy his family for Christmas would gladly buy an electric refrigerator if he thought of it or knew more about it, have planned a Christmas Refrigerator Campaign to "men only."

The campaign consists of four attractive, cheerfully-colored post cards to be mailed to the offices of business and professional men in the community of the dealer. The Christmas motifs on the cards remind him that a General Electric refrigerator is what his wife and family would really enjoy. An electric refrigerator in the home means better living for the whole family, simplifies planning and preparation of meals, and most important of all, gives the family the protection of proper food preservation, the message says.

The first mailing is followed up by personal calls from the dealer salesmen.

The second mailing tells the business man in a general way that an electric refrigerator is a modern appliance. Certainly, he gives consideration to modern appliances for the office—then why not for the home?

The third mailing speaks of the ease of purchasing a refrigerator and mentions a Special Christmas Purchasing Plan.

The fourth mailing, which reaches him just around Christmas day, suggests to him that he should make a decision.

General Electric dealers expect these cards to bring a large share of Christmas business, reaching, as they do, busy business men in a dilemma at the Christmas buying.

TO MEN ONLY

YOUR IMMEDIATE DECISION WILL BRING THIS REFRIGERATOR TO YOUR HOME
for Christmas
So easy to install a General Electric Refrigerator...takes just a few minutes...no pipes ...no connections...simply plugs into the electric outlet like your radio. Say the word ...we'll have it installed for Christmas
GENERAL ELECTRIC
ALL-STEEL REFRIGERATOR
DEALER'S IMPRINT

CONCEALED EAGERNESS

NO selling strategy is so elementary and effective as concealing of eagerness to sell. Ernest Elmo Calkins, talking about this strategy, says: "Very few goods are sold because the purchaser knows the seller wants to sell them. They are sold cause the seller makes the buyer believe that the goods are worth more than the money it will take to buy them. A buyer never thinks of the seller's state of mind. If he did he wouldn't buy."

Salesmen often exhibit startling self-control and courage. I have bought from men who were so suave and unconcerned in my presence that I assumed they had called at my office merely as a compliment to me. I later discovered that the sale to me was the first they had made in a week, and that if they hadn't made the sale they could not have eaten that night.—*The Ediphone.*

WHEN A NEW BABY ARRIVES—PARENTS GET HEALTH LETTER

Strauss-Bodenheimer Company, 606 Preston Avenue, Houston, Texas, distributors for Copeland in that territory, use a letter which is sent out to parents of new babies. The list of new babies is usually recorded in the newspapers, and it is no job at all to get the names and addresses of the parents. One of the letters sent out is as follows:

"Dear Sir:

"May I congratulate you on the new arrival, and at the same time presume to tell you one way to insure yourself giving the little one the right start towards a long healthy life.

"The pamphlet (Eat, Drink, But Be Wary, by Royal S. Copeland, M.D.) enclosed, will tell you of the thousands of babies who had no chance. If you will read it, and after reading, are interested in mechanical refrigeration, I hope you will give us a chance to explain the advantages of the COPELAND Automatic Refrigerator to you.

"I will only say now that the COPELAND will furnish you proper refrigeration at the lowest daily cost of any methods now in use.

"Phone us at Preston 2133—you will never regret it.

"Yours very truly."

This letter, sent out immediately after the arrival of the new baby, not only congratulates the new parents but it gives them some constructive ideas on what is going to be good for their child in the days to come. No one can conceive of anything that is more important in their lives at this particular time.

TEMPRITE COOLERS INSTALLED IN COTTON MILLS

Installation has just been completed of a multiple system of Temprite coolers in plant No. 6 of the Cannon Mills, makers of the famous Cannon Towels, at Concord, N. C.

The installation is unique in that one of the drinking fountains is located some 15 feet below the compressor, with the other three on the above floors. An alley 18 feet wide had to be crossed to reach one of the locations of the fountains.

FRIGIDAIRE TO ERECT ELECTRIC SIGN

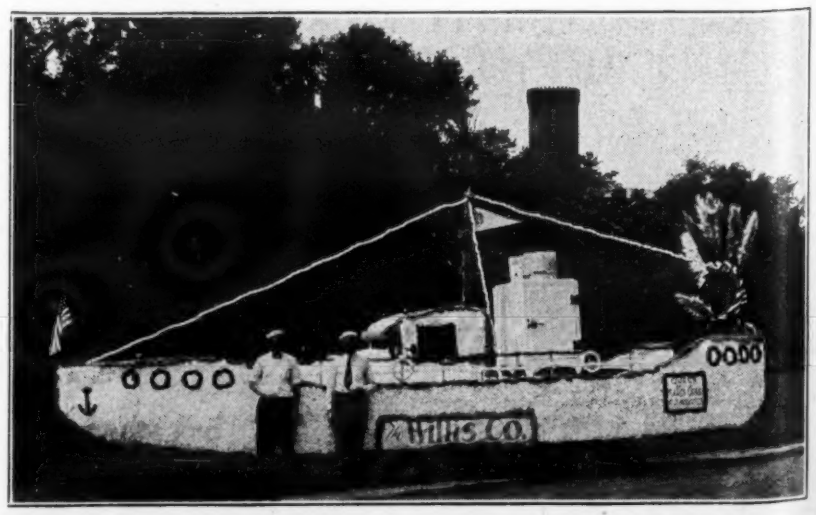
Dayton, Ohio.—A large electric sign, advertising Frigidaire Corp., is to be erected on the old plant of the Peerless Paper Co., Idywild and Webster Streets. This plant was recently taken over by Frigidaire.

The sign will be 120 feet long, while the letters will be 12 feet high. Twelve tons of steel will be used in the construction of the sign and 2,500 lights will be used to illuminate it.

Canton Distributor Wins Trophy for Best Float

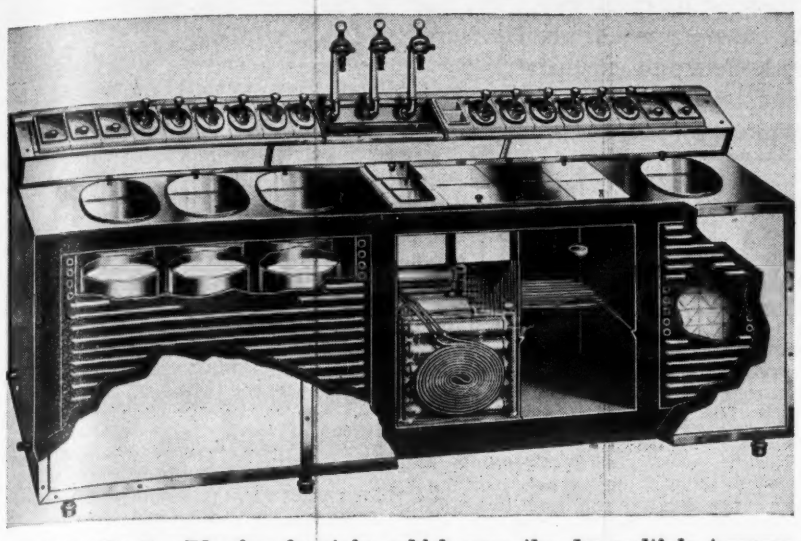
Willis Co., Canton, Ohio, distributors of General Electric refrigerators for some 20 counties in northeastern Ohio, presented this effective float, the work of H. G. Donbar, of the refrigerator service department, in a recent mardi gras, sponsored by Nazir Grotto in Canton, which attracted more than 25,000 persons from all over eastern Ohio.

This float, winner of the first prize, carried the queen of the mardi gras and was the center of interest during the two-day event. Two models of General Electric refrigerators were on the float, and were inspected by thousands when it was parked during the celebration, which lasted two days.



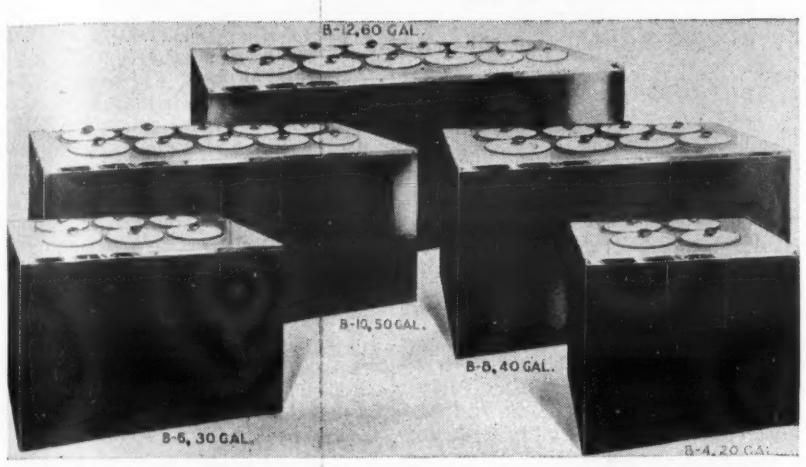
VARIED APPLICATIONS

Dry Multiple Temperature System Used By Bastian-Blessing



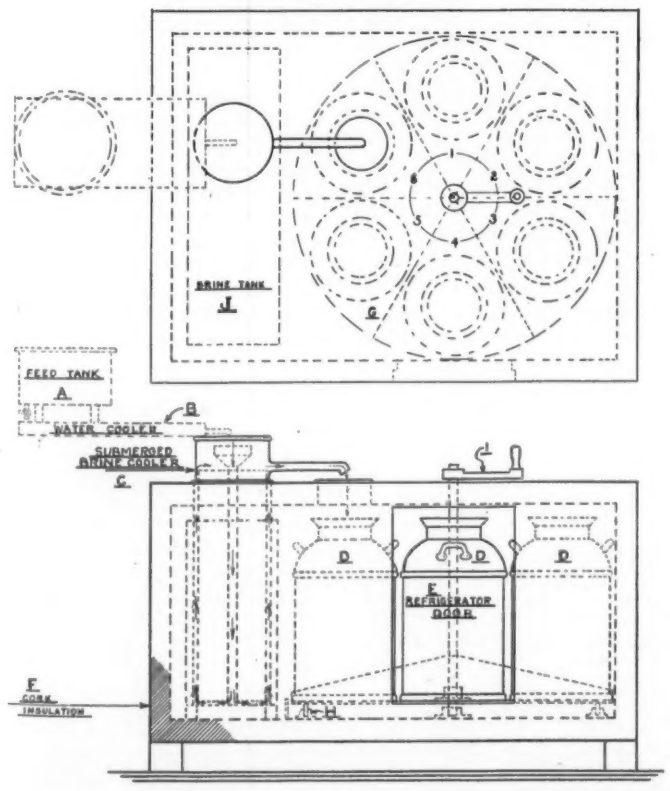
This Bastian-Blessing fountain, which uses the dry-multiple temperature system, is divided into three compartments. The left hand side is used for storage of bulk ice cream. One-half of the center section contains the expansion coils, which come in direct contact with the tank. Soda and plain water in these tanks is kept between 33° F. and 40° F. The other half of the center section is used as a refrigerator while the right hand section is used for the storage of brick ice cream. Insulation is of cypress, corkboard, heavy paper and odorless asphaltum.

Handling of Ice Cream Simplified by All-Square Containers



This group of double-row, all-square ice cream cabinets, manufactured by the Aurora Metal Cabinet Works, Inc., Aurora, Ill., ranges from 4 to 12 holes, cabinets having capacities of 20, 30, 40, 50 and 60 gallons.

Valerius Mfg. Co. Enters Milk Cooler Field



New Valerius Milk Cooler

THIS year the Valerius Mfg. Co., Jefferson, Wis., manufacturers of Valerius ice cream cabinets and soda fountains, have begun the manufacture of a cabinet for cooling milk on farms.

The milk cooler illustrated is of the six 10-gallon size. A smaller model to accommodate four 10-gallon cans is also available.

As milk is brought from the cows, it is poured into the feed tank "A" from which it passes over the water cooler "B." This reduces the temperature from 90 degrees F. or higher to about 60 degrees F.—the amount being dependent upon the temperature of the water and the rates of flow of both the water and the milk. From "B" the milk runs down through the center of the submerged brine cooler "C" and then comes up on the outside of the cooler in a thin film. As the brine tank "J" temperature is maintained at about 30 degrees F. milk leaving the spout is well below 50 degrees F.—and the receiving can is colder than that if it has been in the cooler long enough to be chilled to the 40 degrees temperature of the air in this compartment. When a can is filled, an empty is brought into position by turning the indexed handle "I" of the revolving platform "G." Full cans are stored in the cooler until wanted for delivery.

Removal of the full cans of milk is easily accomplished through the door "E" at the side of the cabinet. Empties are inserted through the same opening.

All metals used in the construction of the cooler are non-corrodible. Heavy corkboard insulation is used.

Any standard one-half horsepower compressor will operate this equipment. Brine tanks are built with boilers or expansion coils.

COPELAND-SPEAR SYSTEM COOLS DRINKING WATER IN PHILADEPHIA THEATRE

One of the world's largest and most beautiful moving picture theatres, the Mastbaum in Philadelphia, has just been equipped with a Copeland-Spear ice water generator system.

A Copeland Model XA 1200 condensing unit and a Spear Model 100 generator supply ice water to 10 fountains connected by over 600 feet of ¾-inch circulating lines, insulated with 1½ inches of cork. The system supplies 900 gallons of drinking water in 12 hours, with only part-time operation. The 10 fountains supplied by the Copeland-Spear system are of tile, marble, and mirrors with all fixtures gold-plated and costing $5,000 each.

The Copeland-Spear ice water generator consists of a Copeland condensing unit and Speak tank, using only the condenser's refrigerant. The tank builds up a cake of ice on its coils. Water from the city mains flow over this before entering the system made up of a ½-inch pipe contained in a larger one which is attached to all outlets. The remotest fountain receives the ice water first. Water reaching the others is kept cool by contact with the inner tube, which is constantly chilled by the water flowing through it fresh from the tank.

SERVEL BOOKLET CONTAINS DATA ON MILK TREATMENT

"Better Milk" is the title given a small booklet which Servel Sales, Inc., Evansville, Ind., recently distributed.

Various types of milk cooling methods are covered; tables are given which show sizes of cooling houses required, with illustrations showing construction and insulation; details of mixing concrete and bills of material are included in the booklet.

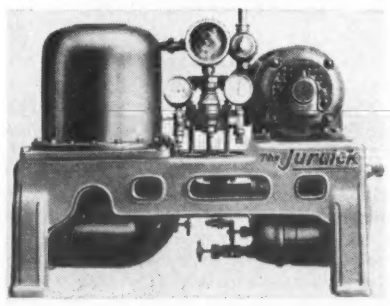
It also gives descriptions of the various Servel electric refrigeration machines and includes illustrations of aerators, agitators, coolers and pumps.

SWITCHES DESIGNED FOR DAIRY MACHINERY USE

A feed through switch, designed for attachment at any point in the feed cord supplying current to electric cream separators, ice cream machines, and other appliances, has been put on the market by the Beaver Manufacturing Co., 625 N. Third St., Newark, N. J.

Another appliance manufactured by the same company is an attachment plug designed for use on portable electric apparatus. The plug has a wooden handle and the rim is encased in rustproof steel. It is larger than an ordinary attachment plug, to facilitate plugging in and out.

JURUICK HAS SMALL CAPACITY UNIT



Juruick Cub

Juruick Refrigerating Division, American Engineering Co., Philadelphia, Pa., offers the "Juruick Cub," a quarter-ton unit, designed as a small capacity machine for dairy applications and similar requirements. It is a self-contained unit, shipped ready for installation.

McCRAY NAMES REPRESENTATIVES IN JOHNSON CITY, TENN.

Johnson City, Tenn.—Taylor-Humphreys Co., 100 East Millard St., will now represent McCray Refrigerator Sales Corporation of Kendallville, Ind., in east Tennessee and southwest Virginia territory.

SCHLINDER BUYS URBANA, O. FRIGIDAIRE DEALERSHIP

Urbana, O.—The Frigidaire agency here has changed hands and is now run by Earl D. Schlinder, 217 Miami St. R. J. Welsh was the former dealer.

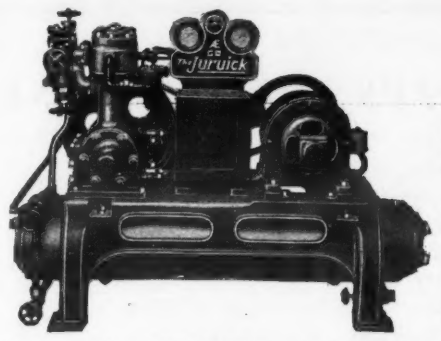
Mr. Schlinder will sell both Frigidaire and Willard batteries, and will continue to do battery service work. His present salesrooms will be remodeled.

Gibson Offers Dairy Display Case

Gibson Refrigerator Co., Greenville, Mich., offers this display case, finished in white porcelain panels divided by Monel Metal and trimmed with blue-black porcelain.

Either ice or mechanical refrigeration can be used with this case, which has adequate display facilities for dairy products.

There is a JURUICK for Every Refrigeration Need



An unbroken line of JURUICK REFRIGERATION units is now ready for big and little jobs of economical refrigeration.

The JURUICK line, superior in every detail, gives smooth, silent performance, has automatic control, is easy to operate.

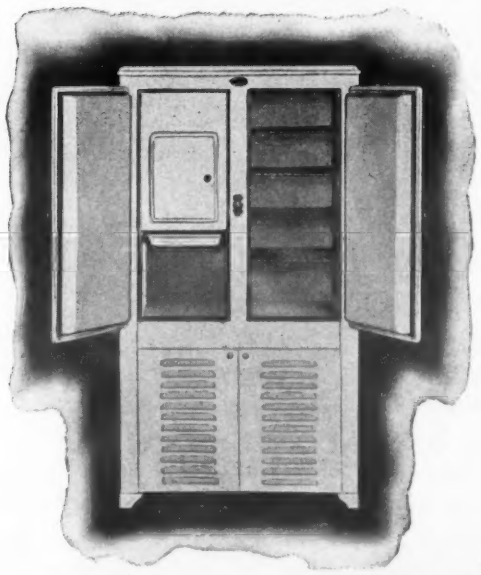
JURUICK REFRIGERATION costs little to install and is easy for dealers to sell. It insures preservation of food, guarantees against waste by spoilage, reduces costs and increases profits.

The complete JURUICK line includes machines from ¼-ton to 40-ton capacity.

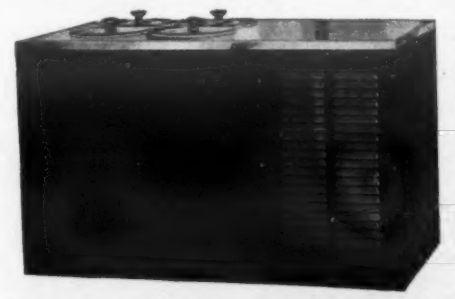
AMERICAN ENGINEERING COMPANY
2420 Aramingo Avenue, PHILADELPHIA, PA.

Universal Cooler quality ~assures sales

THE Universal Cooler Line is exceptionally complete. It contains a wide variety of household cabinets that correctly meet the exact requirements of every type of dwelling—ice cream cabinets of just the right size and capacity for every need from the smallest "stop" to the largest store—and compressor units which range in size from ⅛ H. P. to 1 H. P. However, the noteworthy features which make Universal Cooler one of the easiest selling lines of electric refrigeration are not its completeness and applicability but rather its unusual quietness, economy and dependability of operation.



Universal Cabinet No. 55. Two-door model suitable for large apartments or small homes.



Universal four-hole portable ice cream cabinet.

Booth No. 125, Dairy Industries Exposition, Toronto, Ontario

Universal Cooler Corporation
Detroit, Mich. - - - Windsor, Ontario, Canada

G. E. DISTRIBUTOR GIVES SUCCESSFUL SALESMEN AIRPLANE TRIP TO PLANT

Boston, Mass.—A group of salesmen of the Electric Refrigerator Company of New England, distributors of the General Electric refrigerator, took an airplane trip to the General Electric factory at Schenectady, N. Y., October 3. They made a five-hour tour of the plant and returned to Boston in the plane the same evening. This trip was the grand prize offered to successful salesmen in various parts of the New England

The members of the party included Mrs. Mabel F. Neal, of the Boston, Mass., office, and Mrs. Beatrice Bratseman, of the Providence, R. I., branch, dieticians for the distributors; George C. Wiswell advertising manager, and the following salesmen: Archie Legro and Herbert Ayers, Providence, R. I.; James Daggett, Boston, Mass.; Anthony Doherty, Spring Hill Refrigerator Co., Sommerville, Mass.; Adolph Anderson, Brockton Silent Automatic Co.; Curtis Hicks, Suburban Gas & Electric Co., Winthrop; Harry Walton, Malden Electric Co.; ager; and L. H. Holman, assistant to the president.

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1214 Venice Blvd., Los Angeles, Calif.

Industrial Water Cooling

By J. T. Smith, Engineer
Halsey W. Taylor Co.
Warren, Ohio

AMERICAN industry is without doubt sold on the idea of mechanical cooling of water for drinking purposes for its employees. The average manufacturing executive realizes, or can very readily be convinced, that the use of ice for cooling water is obsolete and expensive.

The business which will be obtained from this source will be of considerable volume; in fact, in the opinion of one of the biggest men in the refrigeration industry, it will rank in volume second only to food preservation. However, to get this business in a satisfactory and profitable manner is going to require a salesman of above average ability. He must know his subject well or he will most certainly come to grief. The tactics which might appeal to a butcher or a restaurant owner will fall flat when tried on a factory manager contemplating the investment of thousands to increase his plant efficiency.

The application of refrigeration to the business of cooling water is probably the most exact branch of the art. There are fewer unknown quantities in the solution of a water cooling problem than in any other problem in refrigeration. Yet it is surprising the number of simple things which are overlooked by the salesman in making a survey for such an installation. It is these simple things that make the difference between a success and a failure. The experience of most distributors of electric refrigeration with water cooling has been rather painful, and it is because of his indifference to the subject that he has not had any profitable business. He will agree with you that the business is there.

Salesmen Must Present Intelligent Proposal

To present an intelligent proposal to the prospective buyer requires quite a little study of his present method, if any, of cool drinking water supply. Quite frequently the salesman can enlighten the plant manager on conditions in the plant pertaining to the drinking water system which will make him sit up and notice. Here is where the salesman's knowledge of his subject is important. There was an instance where a certain concern was using paper drinking cups for the office employees. The salesman making the survey was smart enough to go to the auditor and ask how much money was being spent on the cups. He found that this item alone amounted to $900.00 per year, a fact of which the general manager never dreamed. Another instance was in a foundry where a keen salesman noticed three faucets in different parts of the shop which were open all day long. He asked a foreman why they were open and was told that the men had to wait too long for a cool drink if they were closed. He got a quart cup and checked the waste per minute from each faucet. He then found the rate per 1,000 cu. ft. which they were paying for water, and by a simple process of multiplication he showed the management a $44.00 per month waste item.

These expense items are sometimes hard to pry loose, but unless they are all taken into consideration, the return on the investment in electric cooling will not appear as large as it should. The visible items of expense incidental to a drinking water system using ice are:

The cost of the ice.

The cost of distribution of the ice.

The depreciation of the ice water cooler.

The invisible item of expense is the effect on the efficiency of the employee. Water that is too cold or not cold enough causes frequent trips to the drinking fountain by the employee, with consequent loss of time. If the water is too cold he cannot drink enough at one time to satisfy his thirst. This means another trip to the fountain shortly, to say nothing of the serious effect of cold water on the internal organs. If it is too warm he will not drink it but will return shortly to try it again. After all, it is not the temperature of the drinking water which cools the individual system. The pint of water which the man drinks weighs about a pound. The cooling effect of this one pound of water at 50° F. entering the system of a 150 pound man with a normal temperature of 98° is obviously little or nothing. It is the evaporation of the water through his pores, in the form of perspiration, later on that cools his system. So that the ideal way to get water into his system is to present a sanitary drinking stream of water at an even, palatable but safe temperature. This temperature is given by medical men as 50° to 55°.

The actual return on the investment in electric water coolers in dollars and cents will show from twenty to fifty per cent, depending on the conditions. The invisible return, i. e., the saving in time, increase in efficiency, etc., is difficult to measure but is certainly high.

When the plant management is sold on the idea the most important part of the salesman's job presents itself, namely, making the proper recommendations as to size of coolers, location of stations and type of installation. In these respects mistakes are often made and promises are made that cannot be fulfilled.

Four Methods of Distribution

There are four common methods of drinking water distribution in practice today, and each one has its particular advantage. These methods are:

1. The self-contained unit supplying only one station.
2. The self-contained unit supplying several stations after the so-called "dead end" method.
3. The circulating system.
4. The multiple system, in which two or more cooling units are operated by one compressor.

Regardless of which method is the most economical and desirable for any particular plant, there are a few facts common to each, which must be carefully established. Most important, of course, is to get the coolers large enough to cool enough water on the hottest day. To correctly figure the water required, the number of employees drinking from each outlet must be known. This information can be obtained from the factory timekeeper, and it is well to get from him the maximum number of employees on the payroll when the plant is running at full capacity. The next most important fact is the temperature of the incoming water. The temperature of any city water can be obtained from the engineer of the water works, but in nine cases out of ten the temperature is increased after it enters the building from the mains. The supply lines entering the building should at all times be inspected during the survey. If the supply lines run through boiler and engine rooms, or near steam lines, or near furnaces, the temperature rise will be considerable and the buyer's attention should be called to such conditions before the installation is made—not after.

Self Contained Unit Is Satisfactory

Of the four methods of distribution mentioned above, the self-contained unit is the most satisfactory for the reasons that:

1. The refrigeration losses are at a minimum.
2. It can readily be moved from one location to another with change of factory routine.
3. Additional units can be purchased in the event of plant expansion.
4. The failure of a unit only affects those employees it is supplying.

In most cases this method involves the greatest initial cost, but in the long run it is the best.

The second method, i. e., the dead end system, is probably more abused than any of the four. All sorts of ridiculous schemes are tried, such as locating the cooler in the basement and piping to the top floor of a ten-story building and expecting to get cold water there. A drinking outlet should not be located more than fifteen feet from the cooler. The pipes from the cooler to the outlet should be not greater than ⅜" and should be well insulated. Such an installation works out very well where a cooler is located on one floor and feeding directly up and down to an outlet on the floor above and the one below.

The third system, i. e., the circulating system, is most common for office buildings, hospitals, etc. In such a system the cooling unit with a circulating pump is located in some out of the way place and the water is pumped to various wall fountains throughout the building. The most important consideration in a circulating system is the pipe insulation and location. All sorts of freak pipe coverings are used which have little or no insulating value. The salesman should acquaint himself with good and bad insulation and should know at a glance the difference between real pipe insulation and poor insulation. The next most important fact is the location of the pipe for the circulating system. Large buildings quite frequently have tunnels communicating from one part to another through which all supply pipes, electrical conduit, steam pipes and drains are conducted. The temperature in these tunnels is usually about 120°. If the drinking water lines are located in such places the line losses must be carefully figured and the heat leakage for the particular insulation in use must be definitely known and not guessed at.

Another important consideration in a circulating system is that the normal water pressure in the building be sufficient to supply each outlet, without the aid of the circulating pump. In other words, the function of the circulating pump is to merely overcome friction in the system and keep the water moving and not to boost pressure. To that end the system should be closed and held at city water pressure. It will be found that circulating pumps of the centrifugal type, operating under any considerable discharge pressure, will add considerable heat to the water. A pump which circulates just enough to prevent more than a 5° rise is ample.

The fourth method, namely, the multiple system, has its advantage over the circulating or dead end system in that line losses are eliminated. However, there is a loss in such systems, especially if they operate at high suction pressures. This loss is due to the drop in gas pressure in the suction line from the cooler to the compressor, and will be considerable where the suction lines are of lengths of 75 feet or more. In such cases larger suction lines will help the situation.

Summarizing the important considerations of each of these methods of distribution, ascertain the maximum number of people drinking from an outlet and allow the following amounts for each person per hour. (See table.) Ascertain the maximum temperature at the point where the water enters the cooler. If the unit is equipped with an air cooled compressor, choose a location away from walls and away from furnaces, etc. It is better to use water cooled compressors if the unit is in a location where the temperature of the air will exceed 90° or where the ventilation is poor.

In "dead end" systems it is taking a long chance to pipe the water over 15 feet. Even at this distance the pipe should not be over ⅜" and should be well insulated.

In circulating systems take into consideration the line loss and add it to the normal drinking water load. No matter how good and efficient the cooler, the job will be unsatisfactory unless the pipe is well insulated. The pump should only circulate the water and should not be counted on to impose any appreciable pressure.

1.	Heavy Manufacturing	1/4 gal. per hr. per person.
2.	Light Manufacturing	1/5 gal. per hr. per person.
3.	Office Buildings	1/8 gal. per hr. per person.
4.	Transients	1 gal. per hr. per 100 persons.
5.	Hotels	1/8 gal. per hr. per room. (maximum 1½ gals. per day).
6.	Restaurants	1/10 gal. per person served.
7.	Cafeteria	1/12 gal. per person served.
8.	Theatres	1 gal. per hr. per 75 seats.
9.	Schools	1/8 gal. per hr. per student.
10.	Hospitals	1/12 gal. per hr. per bed. (Plus ⅛ gal. per hr. per attendant).

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"Extra Dry Esotoo" is shipped in cylinders of the following capacities: 150 lbs., 35 lbs., 10 and 5 lbs.

DAIRY ENGINEERING

The Use of Small Units In Dairy Applications

By L. K. Wright
Member of A. S. R. E. and N. A. P. R. E.

MORE than half of the entire milk production of the United States is utilized in the preparation of butter, cheese and ice cream; while the lesser half, that is, about 46 per cent, is consumed in its fluid state as milk and cream. The immensity of the dairy industry is realized when it is found that government statistics place the value of the milk bottling industry alone at over $9,000,000 yearly.

Milk and cream is an emulsion of fat in a serum acting as a vehicle of milk sugar, proteid substances, mineral matter and five known vitamins—A, B, C, D and E.

Until research performed by a number of investigators, including the famous French chemist, Louis Pasteur, definitely determined that the spoilage of milk was due entirely to bacterial activity, very little was known scientifically concerning the souring or spoiling action.

Bacteria

Two groups of bacteria have been established as causing changes in milk. One group, the acid forming type, of which the lactic bacteria are the most common, feed upon the milk sugar and convert it into lactic acid, which brings about the sour flavor. The continued action of lactic bacteria results in viscous masses or curds.

The other bacterial group, the peptonizing species, cause a breaking down or rotting of the animal matter in the milk or cream and render it unfit for consumption.

Most bacteria are harmless to human health, indeed, some certain types are required to bring about changes in milk in order to produce certain types of cheese. Malignant or harmful cultures cause disease, and many epidemics, such as typhoid fever, scarlet fever, and diphtheria, have been traced to milk infected by careless handling and have caused the various health commissions to draft stringent sanitary codes and certain tests relating to the examination of milk and cream before distribution to the public.

Bacterial Growth

Milk and cream, containing casein, albumin, milk sugar and mineral salts, comprise an ideal propagating medium for various bacteria. Bacteria feed or are nourished through the absorption of foods through their envelopes or skins, and require that the food be finely decimated, or dissolved, and moist.

With proper or optimum temperatures, such as between 60 and 98 degrees F., bacterial growth in milk and cream is tremendous, but with temperatures at or below 50 degrees F. multiplication becomes slow; while at temperatures near the freezing point bacterial activity practically ceases. However, while propagation is sluggish, the bacteria are for the most part not destroyed, but merely dormant, so that just as soon as the temperature of the milk is allowed to approach the optimum range they resume their activities.

With the same bacterial type the effect of different temperatures is shown by the following:

Pasteurizing

Heat is applied to the milk for a short period in order to destroy and reduce to a specified number or "count" the number of existing bacteria. In determining the bacterial "count" little attempt is made to count the bacteria by grouping into species, the total count alone being taken to indicate the quality of the milk.

It is unfortunate that in pasteurization of milk that the heat destroys some of the vitamins. The heating is followed immediately by rapid cooling, so that the active bacteria—that is, those not destroyed during pasteurization—are maintained at a temperature where they are practically dormant and propagate but slowly. It is said that 99 per cent of the micro-organisms in milk are destroyed by pasteurization.

Each kind of bacteria has an optimum temperature most favorable to its growth, most of those occurring in milk have an optimum range between 60 and 98 degrees F. Above 100° F. very few bacteria thrive. While the non-spore forming bacteria are killed when exposed for ten minutes to a temperature of 150-160° F., it requires prolonged boiling or subjection to 300° F. to kill the spore forming type of bacteria.

Methods of Pasteurization

Pasteurizing, or the destruction of harmful bacteria in milk, is accomplished in the vat and bottle methods, by heating the batches to 140-145° F., and holding at that temperature for from 20 to 40 minutes.

The flash or continuous flow method subjects the milk to 165-180° F. for only 25 to 30 seconds. Great care must be used in this higher temperature method otherwise it is likely to impart a cooked flavor to the milk. The former method for this reason is preferred by dairymen to the flash method of pasteurizing.

Occasionally a high bacteria count occurs in milk treated only to 145 degrees F., and it has been found that these bacteria not destroyed at the lower pasteurizing temperature can be killed if subjected to 180 degrees F. for two minutes. The particular bacteria causing this abnormally high count, known as pin point bacteria, are harmless to human health, so far as known, but it is best that they be destroyed.

Immediately after pasteurization is accomplished, it is essential to cool the milk as rapidly as possible, due to the fact that the butter globules are very tender at high temperatures. Should the globules break and separate, either through overheating or delay in cooling or due to not chilling rapidly enough, the butter mixes with the milk and will not again separate.

From the above table it will be observed that cream with 33% butter fat will weigh about the same as water, but it will be found that most cream and all milk will be heavier than water.

Correction factors for temperatures other than 68 degrees F., when the weight of 68 degree material is used as a basis for determinations, as advocated by the Division of Weights and Measures of the Bureau of Standards, are as follows:

Temperature	50° F	60° F	68° F	80° F	100° F	120° F	140° F
Multiplier	1.006	1.003	1.0	.9960	.9888	.9831	.9772

Composition of Milk

The average composition of milk, derived from several thousand analysis, is:

Watery Content	87.10%
Butter Fat	3.90%
Other Solids	9.00%

Quantitative analysis of milk further discloses the amount of the various solids, and divides them as follows:

Serum Water	Milk Solids Fat	Sugar
87.0%	4.0%	5.0%

Milk Solids Not Fat Casein	Albumin	Ash
2.6%	0.7%	0.7%

The following table, based on data given in the United States Department of Agriculture Bulletin No. 98, gives the specific gravity of milk and cream, with the weight in pounds per gallon, at a temperature of 68 degrees F.:

Specific Heat of Milk

The specific heat of milk and cream was determined by tests performed by

(*Continued on Page 26*)

THE INCREASE OF BACTERIA IN MILK HELD FOR TWO HOURS AT 85 DEGREES F.

Bacteria per c. c. Original Sample	Bacteria per c. c. at End of 2 Hours	Increase In Numbers	Increase In Percentage
362	2,025	1,663	459.2
560	4,000	3,440	614.2
2,612	24,450	21,838	836.0
3,062	64,700	61,638	2,012.9

SPECIFIC GRAVITY AND WEIGHTS OF MILK AND CREAM AT 68 DEGREES F.

Class	Per Cent Fat	Specific Gravity	Weight in Lbs. per Gal.
Skim Milk	.025	1.037	8.630
	3.000	1.035	8.603
	3.50	1.033	8.595
Milk	4.00	1.032	8.586
	5.00	1.031	8.578
	6.00	1.030	8.570
Milk and Cream	10.00	1.025	8.528
	15.00	1.018	8.470
	18.00	1.015	8.445
Light Cream	20.00	1.013	8.430
	22.00	1.011	8.412
	25.00	1.008	8.387
	28.00	1.006	8.370
	30.00	1.004	8.353
Heavy Cream	32.00	1.002	8.337
	35.00	0.999	8.312
	38.00	0.997	8.300
	40.00	0.995	8.277

EFFECT OF TEMPERATURE ON BACTERIAL GROWTH

For a sample of milk with 3,000 bacteria per 15 drops, kept 24 hours at various temperatures:

	50°	55°	60°	68°	86°
Bacterial count	11,500	18,800	180,000	450,000	1,400,000,000
Ratio of increase:					
24 hours	3.8	6	60	150	467,000
48 hours	..	1,000	9,000	150,000	.....

Under normal conditions, with a temperature of about 85 degrees F., bacteria will develop and split into two distinct bodies, this being their method of propagation, in about twenty minutes. Thus over a period of hours in which propagation has been favored, the last hour of a test in which the animacula are counted will show enormous gain over the previous hour. The increase example, and the last figures given in over a two-hour period is taken as an the table below show a percentage increase over the original sample to be in excess of 2,000 per cent.

All milk and cream, even though the most extreme care is exercised in milking, contains bacteria. While disease bacteria of bovine origin is communicable to human beings, the inspection of cattle eliminates the possibility of unfit milk reaching the household. Very few species of bacteria are of the disease type or produce by-products which are injurious.

The susceptibility of most bacteria to high temperatures is taken advantage of in the milk industry and used to purify and so preserve milk in a condition suitable for consumption.

SPECIFIC HEAT OF MILK AND CREAM

Temperature Degrees F.	Milk With 3.5% Butter Fat	Cream with 20% Butter Fat	Cream With 40% Butter Fat
95.9	0.93	0.89	0.86
66.2	0.95	1.01	1.07
43.7	0.22	0.91	0.90

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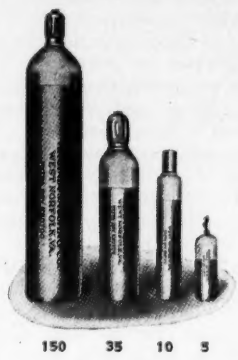

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THE USE OF SMALL UNITS IN DAIRY APPLICATIONS

(*Continued from Page 25*)

the United States Bureau of Standards. It was found that the greater per cent of butter fat in milk and cream would cause a greater change in specific heat, over a given range in temperature, when compared with a fluid with less fat.

Properties of Milk

Normal milk ranges between a bluish white and a golden yellow; it has a sweet flavor and a faint odor.

The average specific gravity of milk may be placed at 1.033, but variance will occur with the per cent of solids other than fats, the per cent of butter fat, and with the temperature.

The temperature selected as standard is 68 degrees Fahrenheit. The higher the temperature and the richer the milk in butter fat the lower the specific gravity. Skimmed milk, with a fat content of 0.025%, will have a specific gravity of about 1.037, while cream with 40% of butter fat will go as low as 0.995 in specific gravity.

Freezing Point

The freezing point of milk will vary, depending upon the water content, but it will always be lower than water. Milk has a freezing point of from 29 to 31 degrees F., and if cooled to, or just below, its freezing point, will only partially solidify.

When milk is frozen it will be found that the cream or fatty content has separated into a distinct layer, while the portion containing the denser solids has formed in a funnel-shaped mass at the center; the sides and remainder, consisting of frozen, so-called skimmed milk, containing very litle cream and solids, will be solidly frozen.

Handling of Milk

The cooling of milk must, of course, begin at the point of its supply, that is, at the farm, in order to discourage bacterial growth.

If a cold spring or brook is available it is customary to construct a cooling tank or pit of either timber or concrete, of such dimensions that the cans may be submerged so that only the can necks remain out of the water. By allowing a supply of water to enter at or near the bottom and by providing an overflow, the milk will be reduced in temperature with very little cost and care.

Should the water supply be limited or of warm temperature unsuitable to adequate cooling, ice may be thrown into the tank. If desired the overflow water may be used to supply the stock drinking troughs or used for irrigation purposes.

Ice Requirements

The daily yield from two cows will require about one ton of ice per six months' period; or, on this basis, a herd of ten cows would require five tons of ice over a period of a half year.

The average daily milk yield per cow, established from data collected from six different breeds of some 400 animals, is 35.5 pounds of milk with 3.5% of butterfat.

Cream that has been carefully handled and kept clean will keep sweet over a period of from 7 to 10 days; if it has been cooled immediately and kept in ice water during the holding period.

Processing

The raw milk to be bottled or distributed from cans is usually received from the farm early in the morning. It is poured into a large vat or receiving tank, and when ready for processing, is pumped to a heater, where its temperature is raised to about 85 degrees F., by means of water jacketed steam coils. The heated milk is then passed through a filter, where the dirt, clots, puss cells, etc., are removed. The filtering is more effective when the milk is warm.

From the filter the milk passes to the pasteurizer, which may either be of the "hold" or "flash" type. The former type is in greater favor and consists of a vat or tank of sanitary design equipped with hot water coils capable of raising the milk to 145 degrees F., at which temperature the milk is held for from 20 to 30 minutes. The water coils used to heat the milk are usually of the cylindrical revolving type, that is, during the process the hot water coil or coils revolve in the batch, assuring fast, even heating. It usually requires about 30 minutes to bring a batch to proper pasteurizing temperature.

The "flash" method consists of allowing the milk to flow in a thin sheet over a surface heated to 170-180 degrees F. Milk pasteurized by the "flash" method is only subjected to heating for an average of about thirty seconds.

After pasteurizing the heated milk is immediately passed to the cooler and reduced to a low temperature.

Milk Coolers

For cooling the milk a tubular cooler, either of the double pipe counter flow design or of the surface cooling type, may be used. The double pipe milk cooler is made up of pipe arranged like a double pipe ammonia condenser, that is, a smaller diameter tube within a larger size. The tubes are of tinned copper and connected by tinned brass fittings; the return fittings for the inner tubes, through which the milk flows in the process of cooling, being rapidly removable to permit thorough cleaning and maintenance of sanitation.

Typical Surface Type Dairy Cooler

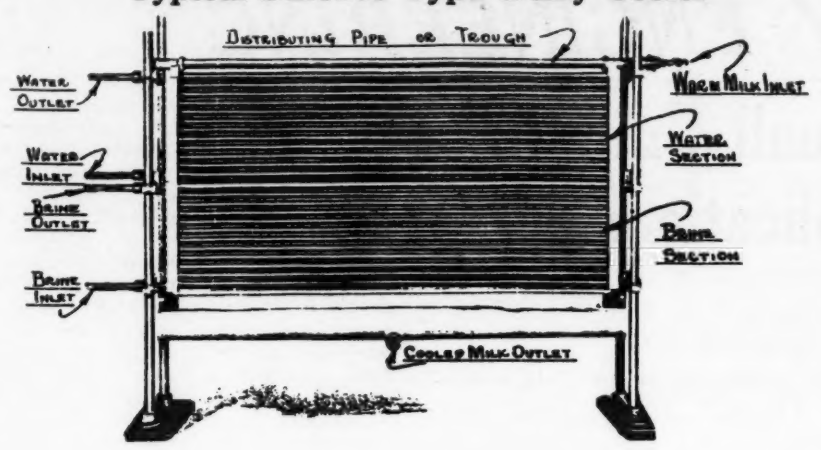

Fig. 1.

Both types of coolers are usually cooled by tap water in the top half, while the bottom half or section utilizes chilled water, brine, or even direct expansion. Where brine or direct refrigerant expansion is used, the lower half must not be subjected to a temperature lower than 20 degrees F., as otherwise the milk is liable to freeze in or on the cooler pipes.

By the use of a brine tank of such capacity that there is but a 10 or 15 degree rise in brine temperature after completing the cooling the milk, the size of the refrigerating apparatus is considerably reduced, as the operating time of the plant or refrigerating unit may be spread over a considerable period. This permits of the installation of small sized plants to cool considerable quantities of milk.

Surface Milk Coolers

The tubular surface milk cooler is of single pipe construction, the hot milk entering a distributing trough at the top and passing through perforations in the trough so that a thin stream or layer results, flows downwardly over the surface of the tinned copper tubes. These units are constructed so that tap water is used in the top half and chilled water (35° F.) or cold brine or refrigerant (24° F.) in the lower half. Where ammonia is to be used in the lower tubes that section must be of steel.

Tubular surface milk coolers, so constructed as to offer continuous surface to the milk flow, are rated in pounds or gallons of milk per hour. Standard coolers, with manufacturers' rating, are given in the following tables:

By referring to the charts a milk cooler of the proper size and capacity can be selected for any of the smaller installations. For larger or continuous service problems several coolers may be used.

As an example a 500-gallon plant will be taken for estimation. This installation would take care of the yield of about fifteen milch cows.

Such a plant would require a milk cooler about eight feet long, having 22 tubes of 2-inch size, the upper half cooled by water and the lower section of 11 tubes cooled by brine.

Water Requirements

With sufficient tap water at a temperature of 75 degrees F., or lower, the top section will reduce the temperature to about 80 degrees F.

In a plant cooling 500 gallons of milk per day, using 75 degree tap water, cooling the milk flowing over the top section from 140 degrees F. to 80 degrees F., the amount of cooling water required can be computed as follows:

500 gal. of milk at 8.6 lbs. per gal. = 4300
Cooling milk from 140° to 80° = 60
Specific heat of milk = 0.935
1 cu. ft. of cooling water rising from 75° to 95° F. will absorb (95 — 75) × 62.27 = 1245.4 B.T.U.

So that:

$$\frac{4300 \times 60 \times 0.935}{1{,}245} = 193.7 \text{ cu. ft. water required}$$

If the cooling is to be accomplished within a two-hour period:

193.7 ÷ 2× 60 = 1.61 cu. ft. of cooling water per minute; or

1.61 × 7.48 = 12.04 gals. of cooling water per minute.

In actual installation it is essential to make certain of the water supply of both the refrigerating unit and the milk cooler by either installing an individual water line and meter, or else to so tap the water supply that the opening of valves elsewhere on the water line will not affect the water supply going to either piece of apparatus.

The water supply and discharge lines should be of adequate size, especially so if the pipe runs are of considerable length.

Brine Requirements

The lower section of the cooler is best cooled with brine. The brine, held in a tank, is circulated through the milk cooler by means of a pump. The tank or tanks should be of such capacity that, after completing the day's milk cooling, the brine temperature will not exceed 40° F. Assuming that the brine was 25° F. when starting to cool the milk, and 40° F. when finished, there would be a 15 degree rise in brine temperature.

By assuming a 20% brine solution and referring to the brine table, this mixture will be found to weigh 73.53 pound per cubic foot and have a specific heat of 0.834.

The required cubic feet of brine necessary to extract the heat from a 500 gallon plant will be:

500 gals. milk at 8.6 lbs. per gal. = 4300
Specific heat of hilk = 0.93
Cooling milk from 80° to 45° F. = 35
1 cu. ft. of brine rising from 25° F. to 40° F. will absorb:
(40 — 25) × 73.53 × 0.834 = 920

So that:

$$\frac{4300 \times 35 \times 0.935}{920} = 153 \text{ cu. ft. brine required}$$

If the milk cooling is to be accomplished within a two-hour period:

153 ÷ 2 × 60 = 1.27 cu. ft. of brine must be circulated through the milk cooler per minute; or,

1.27 × 7.48 = 9.5 gals. of brine will be required per minute.

A pump capable of supplying the milk cooler with 10 or more gallons of brine per minute, after allowances have been made for frictional losses, etc., should be used; the pump feeding the lower pipe of the brine section of the milk cooler first; the top pipe of the brine section returning the brine to the tank.

Storage Rooms

The next to be considered is the milk storage room, in which the milk is to be placed after cooling and wherein it is reduced in temperature from 45° F. to 40° F.

The storage room, like all other refrigerated chambers, should be well insulated. Standard practice advocates the use of 4-inch insulating material for rooms designed for milk and cream storage.

Basing the atmospheric temperature at 85° F., and the storage room temperature at 35° F., there will be a temperature difference of 50 degrees. In northern localities these temperatures are acceptable, but for installations in warmer climates the normal atmospheric temperature is best placed at 95° F., or higher under extreme or unusual conditions.

Milk bottling plants require roughly about 350 cubic feet of box displacement per 100 gallons of milk stored, so that for a 500 gallon plant a box of approximately 1,750 cubic feet would be required. A storage room about 15 feet long, 12 feet wide and 10 feet high, overall, having 900 square feet of surface, will provide adequate storage space, and yet allow for some expansion and additional storage.

The heat leakage of a storage room of this size would be:

900 square feet of surface, with a heat leakage factor or 2.5 B. t. u. per square foot per degree of temperature difference, 900 × 2.5 × (85-35) = 112,500 B. t. u. per 24 hours.

Air changes, due to the opening and closing of the refrigerator doors, while storing or shipping milk, are rather difficult to estimate, there being great latitude between individual installations. If desired, these air changes, with the amount of refrigeration required per charge, may be computed from "Tables on the Properties of Air." It is therefore best to assume a safe usage factor, for extreme accuracy in the amount of refrigeration required for air changes is not required, unless the doors are to be constantly opened, as would be the case if the milk was retailed.

PROPERTIES OF CALCIUM CHLORIDE BRINE AT 60° F.

Per Cent Calcium by weight	Specific Gravity	Freezing Point	Specific Heat	Solution Weight lbs. per cu. ft.
3	1.024	+29	0.980	63.87
5	1.041	+27	0.964	64.93
7	1.058	+25	0.936	65.99
9	1.076	+23	0.910	67.11
10	1.085	+21	0.896	67.67
12	1.103	+18	.0884	68.79
14	1.121	+14	0.868	69.92
18	1.159	+ 4	0.844	72.29
20	1.179	+ 1.5	0.834	73.53
22	1.199	— 8	0.817	74.78
24	1.219	—17	0.799	76.03
26	1.240	—27	0.778	77.34

RATING OF STANDARD TUBULAR SURFACE COOLERS

1½" TUBES — Length of Tubes

No. of Tubes	—4 feet— Lbs. per hr.	Gal. per hr.	—5 feet— Lbs. per hr.	Gal. per hr.	—6 feet— Lbs. per hr.	Gal. per hr.	—7 feet— Lbs. per hr.	Gal. per hr.	—8 feet— Lbs. per hr.	Gal. per hr.	—9 feet— Lbs. per hr.	Gal per hr.
6	450	52	550	65	675	78	775	90	900	104	1000	11
8	600	69	750	88	900	104	1050	122	1200	137	1350	157
10	750	88	925	107	1125	131	1300	151	1500	175	1675	194
12	900	104	1125	131	1350	157	1575	180	1800	208	2025	233
14	1050	122	1300	151	1575	180	1875	218	2100	244	2350	274
16	1200	137	1500	174	1800	208	2100	244	2400	264	2700	314
18	1350	157	1675	194	2025	235	2350	274	2700	314	3025	377
20	1500	174	1850	214	2250	250	2600	303	3000	348	3350	390
22	1650	191	2050	234	2475	274	2875	332	3300	382	3700	430
24	1800	208	2250	250	2700	314	3150	367	3600	416	4050	472

2" TUBES — Length of Tubes

No. of Tubes	—6 feet— Lbs. per hr.	Gal. per hr.	—8 feet— Lbs. per hr.	Gal. per hr.	—10 feet— Lbs. per hr.	Gal. per hr.	—12 feet— Lbs. per hr.	Gal. per hr.	—14 feet— Lbs. per hr.	Gal. per hr.	—16 feet— Lbs. per hr.	Gal per hr
6	900	104	1200	137	1500	174	1800	208	2100	244	2400	26
8	1200	137	1600	186	2000	232	2400	264	2800	266	3200	37
10	1500	174	2000	232	2500	291	3000	348	3500	408	4000	46
12	1800	208	2400	264	3000	348	3600	416	4200	488	4800	55
14	2100	244	2800	326	3500	408	4200	488	4900	570	5600	65
16	2400	264	3200	374	4000	464	4800	558	5600	650	6400	74
18	2700	314	3600	418	4500	513	5400	628	6300	731	7200	83
20	3000	348	4000	464	5000	581	6000	698	7000	815	8000	93
22	3300	382	4400	515	5500	687	6600	764	7700	896	8800	100
24	3600	416	4800	560	6000	698	7200	837	8400	978	9600	110
28	4200	485	5600	652	7000	815	8400	975	9800	115	11200	1130

For normal work a factor of 15% of the surface leakage will be found ample. Therefore, the amount of refrigeration for door usage, etc., may be assumed to be:

.15×112,500=16,875 B.T.U. per 24 hours.

Coolng Storage Rooms

There are several methods or designs which may be used to cool and maintain air circulation in the storage room.

One method is to hang a flat coil or coil bank a few inches from the ceiling and place the tanks holding the brine used for cooling the milk against the walls of the cooler.

A double pipe brine cooler may be used to cool the brine, or direct expansion coils may be submerged in the tank or tanks. The best method of installing the double pipe brine cooler is to place it over one of the brine tanks, so that in the event of a stoppage in the pipe line, or pump failure, the brine will drain from the cooler into the tank, eliminating the possibility of freezing the solution in the cooler. This method, however, cuts down the height of the tanks, and thus necessitating the use of squatty, broad tanks, is not economical of storage space.

Many installations in which the brine coolers were completely submerged in the brine tank have functioned perfectly. It is best, when the submerged installation is decided upon, to use a dual switch, so that the compressor cannot be operated without the brine pump. Sometimes by means of countershafts or extra pulley the compressor and brine pump are driven by the one motor.

The brine tanks are usually placed against the sides of the box, for most dairy applications use a low head cooler. As the tanks are to act as cooling surfaces to maintain box temperature, they are not provided with insulation.

A great many dairy installations have proven unsatisfactory where the owners have insisted upon very low head storage rooms. Dairy boxes should not be equipped unless at least eight feet of clear height is available. The desirable height is from 9 to 10 feet of clear height, and best results are obtained through the use of these high head boxes. The additional cost due to height is negligible when results must be guaranteed.

Where it is absolutely necessary to utilize a low head box, baffles must be used to aid in air circulation. Brine tanks alone, or even where aided by direct expansion coils, will not provide a

(*Continued on Page 27*)

THE USE OF SMALL UNITS IN DAIRY APPLICATIONS

(*Continued from Page 26*)

thoroughly satisfactory installation, unless properly insulated baffles are used and sufficient clear and unobstructed air chutes or ducts of the proper size are provided.

If a double pipe brine cooler is to be used, the following data may be used to determine the necessary size:

Brine Cooler

For double pipe brine coolers, constructed of 2- and 3-inch pipe, the necessary amount of pipeage may be computed as follows:

Total B.T.U. to be extracted × 1.328÷ 55 B.T.U. per hr. × (Brine Tem. — Am. Tem.) × Hr. of operation = total lineal feet of cooler required.

This formula assumes the absorption of 55 B. t. u. per hour, per degree temperature difference, per square foot of pipe surface.

The length of the cooler that can be accommodated within the allotted space then determines the number of pipes high that the cooler may be. It is best to leave at least eight inches of space between cooler ends and the wall, for such service work as cleaning or repairs. Brine coolers rarely exceed the stock length of pipe, that is, twenty feet, and usually vary between that length and eight feet.

The old method of constructing brine coolers was to utilize special fittings with packed glands. This would allow any tube to be removed and replaced. The more modern type of construction is the all-welded cooler, in which all the pipe is welded, eliminating fittings and all chance of leakage that commonly occurred at joints, gaskets or porous spots in the castings.

In place of the double pipe cooler, direct expansion coils may be used, completely submerged in the brine. In most installations the coils are to be preferred to the double pipe coolers. The brine tanks in this method can be made up in small, easily-handled sizes, which are more convenient for small installation crews to erect. The coils can be so constructed and equipped with fittings that they need only to be joined together by bolts. Where shipping and transportation is an important factor, this latter method lends itself as being the most satisfactory.

The brine tanks may extend from within ten inches of the floor to within eight inches of the ceiling. At least six inches should be left between the wall and the side of the tank for proper circulation of air. It is important to see that the air passages are sufficiently large so that they do not become obstructed through the formation of ice and frost.

On installations where space necessitates the use of rather broad or square boxes, it is best to utilize baffles so that air circulation will be induced and the air properly guided.

The baffles must be properly insulated, designed and placed if excellent results are desired. Poorly placed or improperly insulated baffles are distinctly detrimental; a hindrance rather than offering assistance in the guidance and circulation of air.

Cooling of Milk Stored

The amount of heat removed by the brine cooler from the milk may be determined as:

500 gals. of milk @ 8.6 lbs. per gallon	=	4,300
Cooling milk from 80° to 45°	=	35
Specific heat of milk	=	0.935
or		
500 × 8.6 × 35 × 0.935	=	140,717

The amount of heat to be removed from the milk, after cooling, bottling and storing in the milk room, will be:

4,300 lbs. of milk (500 gals.) at 0.935 specific gravity, cooled from 45° to 40° F. = 20,102.5 B. T. U.

The glass milk bottles average about 6.75 pounds per gallon of milk, so that in cooling the bottles (6.75 x 500) from 85° F. to 35° F., with glass having a specific heat of 0.161, the heat extracted would be:

6.75×500×0.161×(85—35)=27,168.7 B. T. U.

Wooden bottle cases average about 4.38 pounds per gallon, so that for 500 gallons of bottled milk there would be:

500 × 4.38 = 2,190 lbs. of wood, with a specific heat of 0.467, from which heat would have to be removed. Thus:

2190×0.467×(85—35)=51,136.5 B.T.U.

Where small plants or units are located close to the milk cooling apparatus, the heat leakage of lines and connections may be entirely ignored, if they are insulated. When the brine lines are of considerable length it is best to estimate their heat leakage or assume some factor of loss and include it in the estimate of actual work to be performed by the refrigerating machine or unit.

Total Refrgeratng Duty

The total refrigerating duty that would be imposed upon the refrigerating plant by a simple 500 gallon milk installation would be:

	B. T. U.
Milk cooled	140,717
Milk in storage	20,102
Cooling bottles	27,169
Cooling wood cases	51,137
Room leakage	112,500
Usage leakage	16,875
total work to be done.	368,500

Installing Brine Tanks In Cooling Room

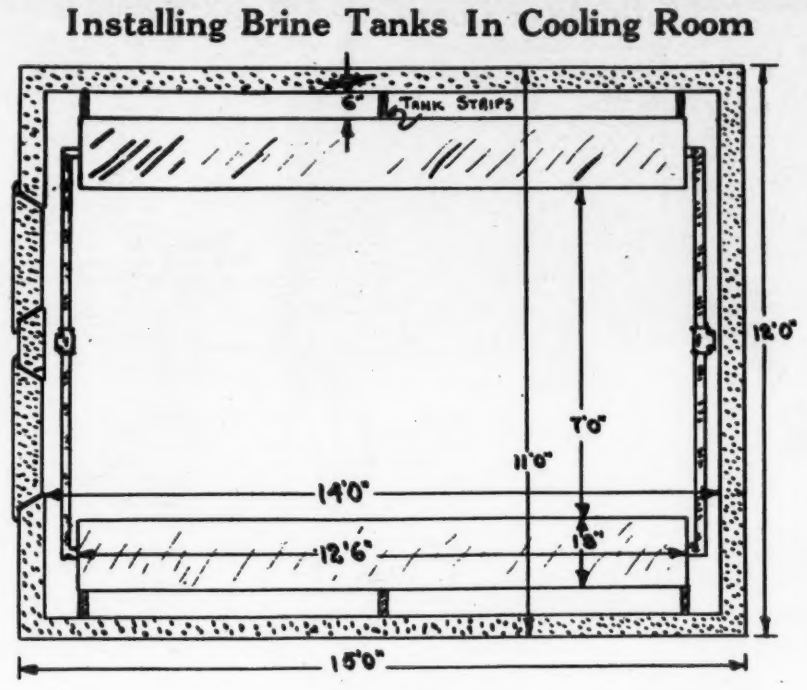

FIG. 2.

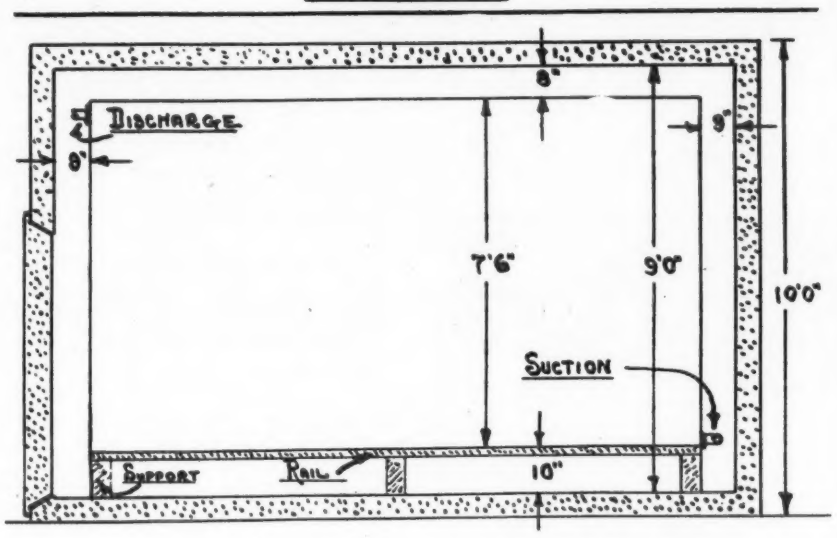

FIG. 3.

Refrigerating Plants

The type of the refrigerating plant or unit should be selected with care. Refrigerating plants of the automatic type require but little attention and may operate over long periods. Automatic plants should be estimated as operative from 12 to 18 hours per day, while manually controlled apparatus should be figured for eight-hour running periods, or less, per day.

It is best to install a plant capable of handling a somewhat larger load, so that in the event of business expansion or fluctuation a new unit will not be required.

Since a one-ton plant operating per day of 24 hours will have the cooling effect equal to that produced by the meltage of one ton of ice, that is, 288,000 B. t. u., the size of the plant required is dependent upon the duty and operating time.

If an automatic plant is to be used, operating 18 hours per day, the size may be calculated as capable of extracting:

288,000×18=216,000 B.T.U. per day,

24

while manually controlled apparatus operated only eight hours per day would be capable of extracting only

288,000×8=96,000 B.T.U. per day.

24

Based upon these factors the size of the plant may be determined.

An automatic plant operating 18 hours per day and capable of performing the refrigerating duty imposed by this particular dairy installation, would have to be:

368,470

———=1.7 ton or a 1¾ ton capacity plant.

216,000

The manually controlled apparatus, operating but eight hours per day, would require:

368,470

———=3.8 ton or a 4 ton capacity plant.

96,000

Automatic plants, operating over longer periods, are more economical to install and maintain. In some outlying districts a smaller plant may sometimes be installed without trouble, while a larger plant may necessitate the running of a new electric power line.

Most small automatic plants are termed "units," due principally to the fact that the motor, compressor, condenser, receiver, together with controls, gauges, etc., are mounted on a common base. These units are easily placed, and being compact, require less room than other types. The entire unit is factory tested and usually required little or no testing other than that of determining that the entire system is gas tight.

Assuming that an automatic plant is to be installed, operating 18 hours per day, it remains to determine the amount of pipe and brine required for the storage room.

Brine Tank Requirements

Assuming that it is best to make an installation incorporating the exclusive use of brine tanks, without auxiliary atmospheric cooling or direct expansion coils, it is best to first determine the amount of brine tank surface required.

The amount of brine tank surface necessary to cool the storage room and its contents may be ascertained by reviewing the estimate of the work to be performed and selecting that portion of the work which is to be accomplished by the tank surface, viz.:

	B.T.U.
Milk cooled in storage	20,102
Cooling bottles	27,169
Cooling wooden cases	51.137
Room insulation leakage	112,500
Usage factor leakage	16,875
	227,783

Assuming a heat transfer factor of 2.75 between the tank surface and the air of the cooler, and eight degrees as the difference in temperature between the room (34° F.) and the tank (average 26° F.) the amount of surface may be determined by the following calculation:

227,783÷2.75×8×24=about 431 sq. ft. of surface required.

Now, if the storage room, as previously estimated, has the following inside dimensions:

14 ft. × 11 ft. × 9 ft.

brine tanks of about 12 ft. 6 in. in length could be placed along the longer walls of the box. This would leave a good clearance (9 in.) between the tank ends and the wall. At least six inches should be left as a minimum, and preferably between 9 and 12 inches, if possible, to prevent frost from building up and shutting off circulation.

As previously mentioned, these tanks may extend from within 10 inches of the floor to within 8 inches of the ceiling. The allowable height of the tank is therefore 7 feet 6 inches.

The long side tank surface under these conditions would be 7′ 6″ × 12′ 6″ =93.75 sq. ft. per long side.

There being two tanks, the long side surface of both would be 93.75 × 4 = 375 sq. ft.

If the tanks are made 18 inches in breadth, the surface of the ends would be 7′ 6″ × 1′ 6″ × 4 = 45 sq. ft.

The bottom surface of both tanks would be, without deductions for supporting rails:

12′ 6″ × 1′ 6″ × 2 = 37.5 sq. ft.

The total of the tank surfaces may therefore be placed at

375 — 45 — 37.5 = 457.5 sq. ft.

This amount is somewhat more than required, but through the use of tank supports or rails, and due to not filling

(*Concluded on Page 28*)

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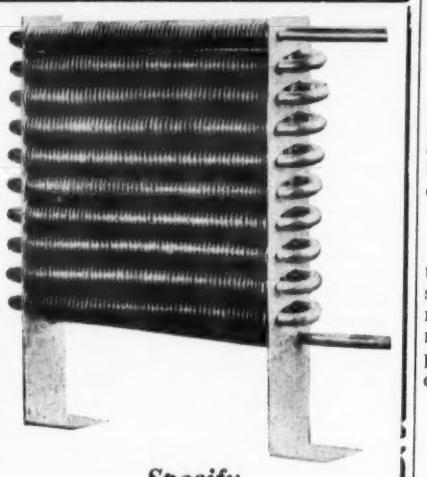

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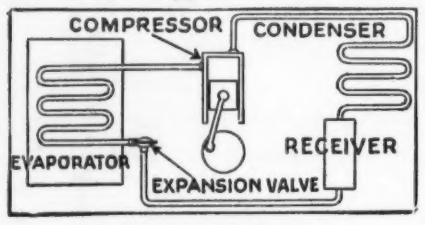

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THE USE OF SMALL UNITS IN DAIRY APPLICATIONS

(*Concluded from Page 27*)

the brine tanks to the very top, it is best to over-estimate somewhat.

If the tanks are made 18 inches in breadth, 12 feet six inches long, and seven feet 6 inches high, the contents will be about 281 cubic feet. After determining the length of pipe to be immersed in the brine, the displacement should be ascertained and deducted from the cubical contents of the tanks previously estimated in order to assure the proper amount of brine being available, that is, 153 cubic feet.

By referring to Fig. 2 it will be observed that this method of installing the tanks leaves a clear working space of seven feet in breadth.

Tank Connections

The two tanks are connected, preferably at the dead end of the box. It is best, as in Fig. 4, to tee into both tanks at the bottom on one end for the pump suction and to discharge the circulated brine into the tanks at the opposite ends of the tank, so as to assist circulation. Another method is to connect both tanks at the dead ends at the bottom, provide a suction at the bottom of the opposite end of one tank, and discharge the circulated brine into the same end of the other, as shown in Fig. 5.

A valve, or preferably a pair of valves, with a strainer between, should be inserted in the suction line so that all sediment may be removed from the brine and prevent clogging of the lines or damage to the pump.

Space Requirements

With the determination of the brine tank sizes and the amount of clear space available for storage, this space may be checked to ascertain the correctness of the estimate for the storage of particular sizes of either milk cans or crates, by the use of the following data:

Milk Cans

Size	Diameter	Height
5 gal.	10¾"	24"
8 gal.	14"	20"
10 gal.	14½"	19½"

Delivery crates holding 12 quart bottles take 1.8 cubic feet of space. Add 25% for passageways.

Brine Coils

After determining the brine tank sizes the coils may be estimated and designed to fit the tanks.

It is usual in small tonnage installations to use either one-inch or inch and one-quarter pipe. Large installations make use of 2-inch pipe.

The surface of the pipe is used as a gauge in determining how many lineal feet of pipe will be required. There are 2.9 lineal feet of 1-inch pipe, 2.301 lineal feet of 1¼-inch pipe, and 1.328 lineal feet of 2-inch pipe to the square foot of surface.

On a medium-sized plant of the type being estimated, it is best to utilize 1¼-inch pipe.

The amount of pipe required in the brine tanks may be determined by the following formula:

Total B.T.U. × pipe factor ÷ hours operation × temperature difference × exchange factor = lineal feet of pipe;

or, if we are estimating for a manually controlled plant and desirous of using 1¼-inch pipe, the formula would be:

$$\frac{368500 \times 2.30}{8 \times (20-0) \times 8} = \text{about 662 lineal feet.}$$

For an automatic plant operating 12 hours per day, about 442 lineal feet would be required, for 14 hour operation approximately 334 lineal feet, and for automatic installation operating 18 hours per day only 294 lineal feet would be required.

The coils suitable for operation in conjunction with an automatic plant operating 14 hours per day, will be selected as an example and the coils designed in accordance.

Two coils, one for each tank, may be estimated as each coil containing about 168 lineal feet.

Each coil may be about 12 feet long, leaving three inches clearance between the ends of the coil and the tank. If made of the plain oval or oblong single pipe type, the total length of pipe in one side or turn would be about 12 feet 4 inches, the coiling being 10 inches in width. A coil of seven pipes high per side would have about 172 lineal feet of pipe. With a coil of such size the pipes may be spaced six inches apart, and the coil provided with legs or supports of flat steel or band iron so that the coil is supported and held in the upper portion of the tank. By keeping the coil in the upper portion of the tank, circulation of brine is induced and better cooling accomplished.

The coils are best supported by 1½" x ¼" flat iron, and held by ⅜" bolts. These legs should be spaced from five to six feet apart. In this case three legs per side or six legs per coil will be required. It is best to place one set of legs 12 inches from the ends and provide a center support. Thus the coil is supported by legs 12 inches from each end and by legs in the center five feet distance from either end legs. Fig. 6 is a work sheet or drawing suitable for such coils required in this installation.

In placing the coils in the tanks, place a block of wood for the coil supports to rest upon or else the legs, usually sheared, may have a sharp edge which may dig through the tank bottom and cause a leak.

It is best to provide a cover for the tank to prevent contamination of brine with sticks, glass, paper, straw or dire.

The tanks are best supported on 4" x 4" spruce legs, with either 2 x ¾ channel irons, or else 4" x 4" spruce rails. The rails or channel irons are absolutely necessary as otherwise the tanks may sag and leak.

The tank supports are preferably located in approximately the same relative dimensions, that is, a set of legs at the ends and an additional set in the center.

Several iron strips should be used to hold the tanks rigidly to the walls of the cooler. Long tanks, such as are employed in this instance, should have a strip at both ends and one at the center. These strips are shown in Fig. 2.

In order to prevent bulging of the tanks due to the weight of the brine, it is best to construct them with angle iron reinforcements. Angle iron should be used at the top and a flat iron strip fastened across the top after the coils have been inserted. By placing the strip before the brine is placed in the tank, bellying or bulging is prevented.

Summation of Estimate

With the data thus obtained, recommendations can then be made, and an estimate of costs given.

The factors used in estimating and design are variables, and consideration of sign are variable, and consideration of this fact must always be borne in mind.

A number of formulas that have been tried by actual practice and installation, and which have proven successful, are appended to aid in the rapid calculation of small installations.

Methods of Connecting Brine Tanks

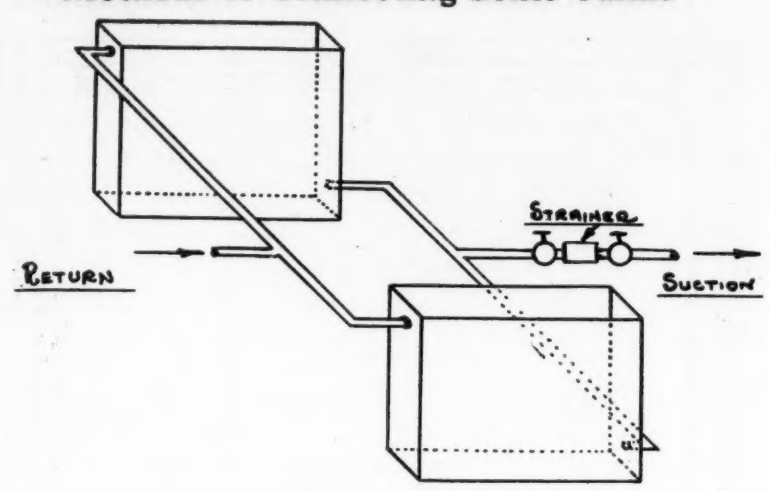


FIG. 4.

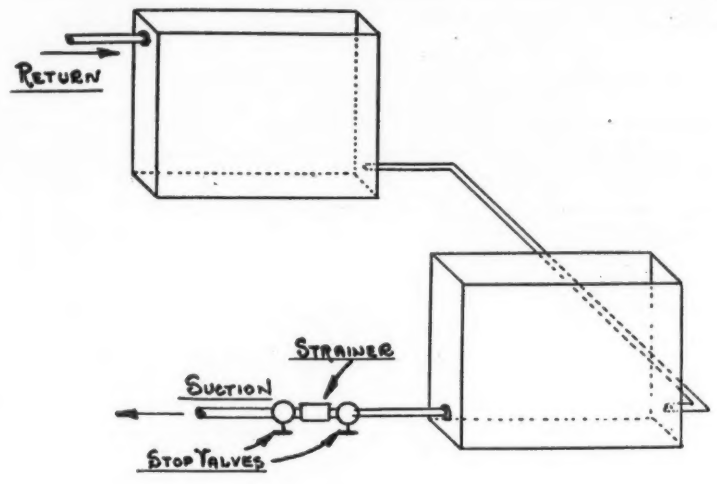
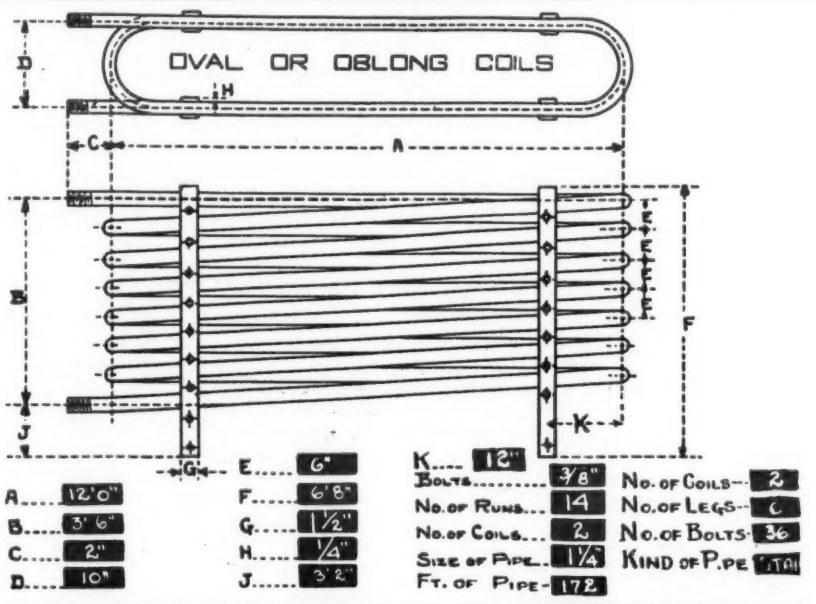


FIG. 5.



FORMULAS

Milk Cooling Load, B. T. U. per Hour of Machine Operation

$$\frac{G \times W \times H \times T}{R}$$

G=Gallons of milk per day.
W=Pounds of milk per gal. (8.6 lbs.).
H=Specific heat of milk (0.9).
T=Degrees cooled (from 98° to 38° F.=60).
R=Operating time (12 hours per day).

$$\frac{G \times 8.6 \times .9 \times T = 7.74\ G\ T}{R} = \frac{}{R}$$

or

$$\frac{G \times 8.6 \times .9 \times 60}{12} = 38.7\ G$$

Where T=60 and R=12

Milk Cooling Load, B. T. U. per Hour of Machine Operation

Where the milk is cooled to 75° or 80° F. with water, and temperature reduced from that point to 35°-40° F. with brine.

Where T=40 (cooling from 75°—35° F.) 80°—40° F.)

$$\frac{310\ G}{R}$$

R = 12 hours operating time

$$25.8\ G$$

Gallons of Brine Required for Milk Coolers (10° Rise)

$$\frac{154.8\ G}{B}$$

$$B = \frac{10 \times .8 \times 10}{154.8\ G} = 1.94\ G.$$

B = Gallons of brine (10 lbs. per gal.).
W = Weight of brine (10 lbs. per gal.).
H = Specific heat of brine (.8).
T = Temperature rise (10°).
G = Gallons of milk to be cooled.

Gallons of Milk Required for Milk Coolers (15° Rise)

$$2.91\ G$$

Size of Brine Tank (10° Rise)

$$.27\ G = \text{Cu. ft. of brine.}$$

Size of Brine Tank (15° Rise)

$$.405\ G = \text{Cu. ft. of brine.}$$

Coilage for Brine Tank

$$\frac{8\ G}{R} = \text{feet of 1" pipe coil.}$$

$$\frac{6.3\ G}{R} = \text{feet of 1¼" pipe coil.}$$

G = gallons of milk to be cooled.
R = running time of machine.

Brine Tank Coilage—1" Pipe

$$L = \frac{A \times B}{K \times T} = 029 \times A.$$

A = Total B.T.U. per hour of machine operation.
B = Lineal feet of 1" pipe per sq. ft. of external surface (2.9).
K = Heat transfer (5).
T = Temperature difference between ammonia in pipe and brine in tank (20°).
L = Feet of 1" pipe.

Brine Tank Coilage—1¼" Pipe

$$L = \frac{A \times B.}{K \times T} = .023 \times A.$$

A = Total B.T.U. per hour of machine operation.
B = Lineal feet of 1¼" pipe per sq. ft. of external surface (2.3).
K = Heat transfer (5).
T = Temperature difference between ammonia in pipe and brine in tank (20°).
L = Feet of 1¼" pipe.

Refrigerator Load, B. T. U. per Hour of Machine Operation

4" sheet cork walls = K 2.5.
Temperature difference = T 50.
Usage factor = U 1.25.

$$\frac{13\ S}{}$$

Total B. T. U. Load Imposed on Machine

Milk cooling—Refrigerating cooling
25.8 G—13 S.

Solid Concrete Tank Leakage

Where a solid concrete tank, usually sunken and flush with floor, is used for brine, insulation consisting of cinders or sand or both around tank.

B. T. U. per hour machine operation = $\frac{S \times K \times T \times U}{R}$

S = Sq. ft. outside surface of tank.
K = Heat transfer (10).
T = Temperature difference (outside 80°/75° F. tank at 40°/35° = 40).
U = Usage factor (1.25).
R = Operating time of machine (12).

$$\frac{S \times 10 \times 40 \times 1.25}{12} = 41.7\ S$$

S = Sq. ft. outside surface of tank.
K = Heat transfer (2.5).
T = Temperature difference (40).
U = Usage factor = (1.25).
R = Operating time of machine (12).

$$\frac{S \times 2.5 \times 40 \times 1.25}{12} = 10.4\ S$$

Total Load Imposed on Machine, Using Concrete Tank

Total B.T.U. per hour run (milk cooling and tank load) = 38.7 G + 41.7 S.

Total Load Imposed on Machine, Using 4" Sheet Cork Tank

Total B.T.U. per hour run (milk cooling and tank load) = 38.7 G + 10.4 S.

Butter Making and Storage

It takes about 2.75 pounds of cream to make 1 pound of butter, or 1 gallon of cream of 8.4 pounds weight per gallon will make about 3 pounds of butter.

Refrigeration Required for Butter

B. T. U. per hour of machine operation = $\frac{W \times H \times T}{R}$

W = Pounds of butter.
H = Specific heat of butter (.55).
T = Degrees cooled (usually 26°, derived from assumption of butter being 58° F. and chilled to 32° F.)
R = Running time in hours of machine = Running time in hours of machine (12).

$$\frac{W \times .55 \times 26}{R} = 1.2\ W$$

Sizes of Butter Tubs

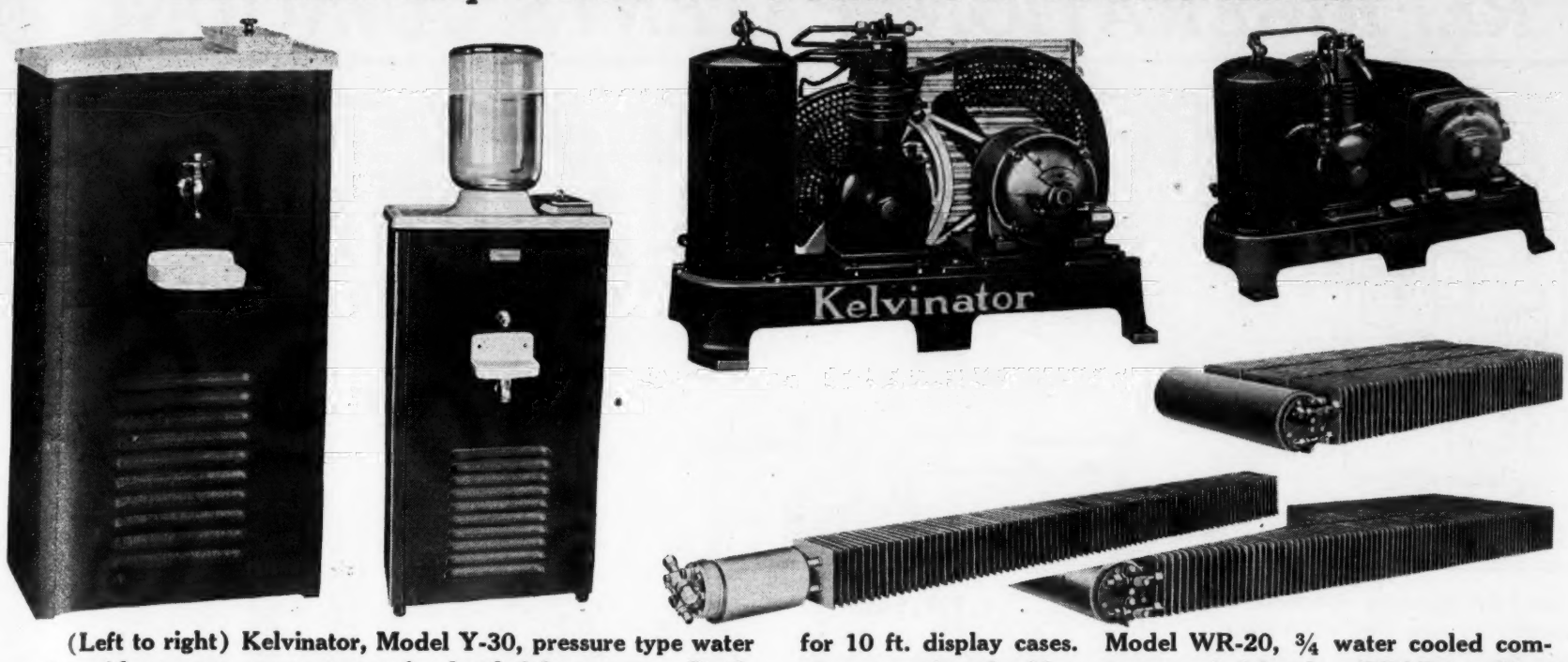
63 lb. standard tub is 15¾" in diameter and 15" high.

60 lb. tub is 15" in diameter and 15" high, including cover.

Estimate 2½ cu. ft. per tub, including the space allowed between.

Total wall surface divided by eight equals approximate tubs of butter that can be stored in one single row.

Kelvinator Corp. Makes New Additions to Commercial Line



(Left to right) Kelvinator, Model Y-30, pressure type water cooler with storage compartment for bottled beverages. Bottle type water cooler, Model Y-10, also equipped with storage compartment. Model R-10, ¾ hp. air cooled compressor with refrigerant cooled head. (Below) Cross fin cooling unit, Model X-50 for 10 ft. display cases. Model WR-20, ¾ water cooled compressor equipped with a water cooled head. (Middle) Giant Model X-5-130 cross fin cooling unit for commercial refrigerators. (Below) Triple section, cross fin cooling unit, Model X-5-145.

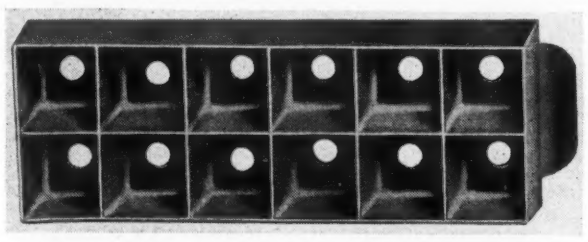
KELVINATOR Corp., Detroit, has just announced additions to its commercial line, consisting of a new air-cooled unit with refrigerant-cooled compressor head; a new model water-cooled unit with water-cooled compressor head; four new cross-fin coil cooling units, including one for large commercial refrigerators, 42" long, triple section type, and another giant model cross-fin cooling unit 66" long, triple section type, with capacity equivalent to 105 tons of ice per year. There are also two new water coolers, each with mechanical unit in base, fitted with storage compartment for beverage bottles, lunches, etc. These include a bottle type and a pressure type water cooler for connection to city water lines, especially suitable for offices and factories.

With the two new condensing units, Kelvinator dealers now have available fifteen separate condensing units, including eight heavy duty models especially designed to handle heavy refrigeration loads.

The new Kelvinator giant model cross-of its type that is of unit construction, fin coil of the larger size is the first unit and will handle the average market cooler. Previous practice has required two cooling coils to do the job.

According to J. M. Fernald, commercial manager of the Kelvinator Corporation, commercial sales for the fiscal year ending September 30, 1929, showed an increase of more than 100 per cent over the previous fiscal year.

Gibson Announces New Ice Cuber

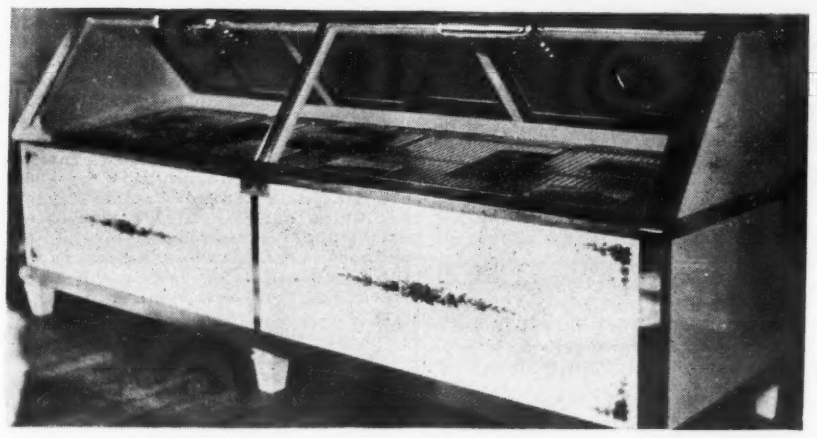


Ice Cuber Which Will be Featured With Gibson 1930 Line

Gibson Refrigeration Co., Greenville, Mich., has designed an automatic ice cuber which will be standard equipment of their new 1930 line.

The Gibson ice cuber is built of special metal and is so constructed that when inverted upon a cake of ice, it automatically makes ice cubes in a very short time. The ice cuber is a non-electric device.

Display Counter For Dairy Products



This porcelain display case, manufactured by Northey Manufacturing Company, Waterloo, Ia., is used in milk depots for the showing of dairy products.

Expands Line of Display Jars

Thermos containers with capacities ranging from 1 to 15 gallons are now being manufactured by American Thermos Bottle Co., Norwich, Conn.

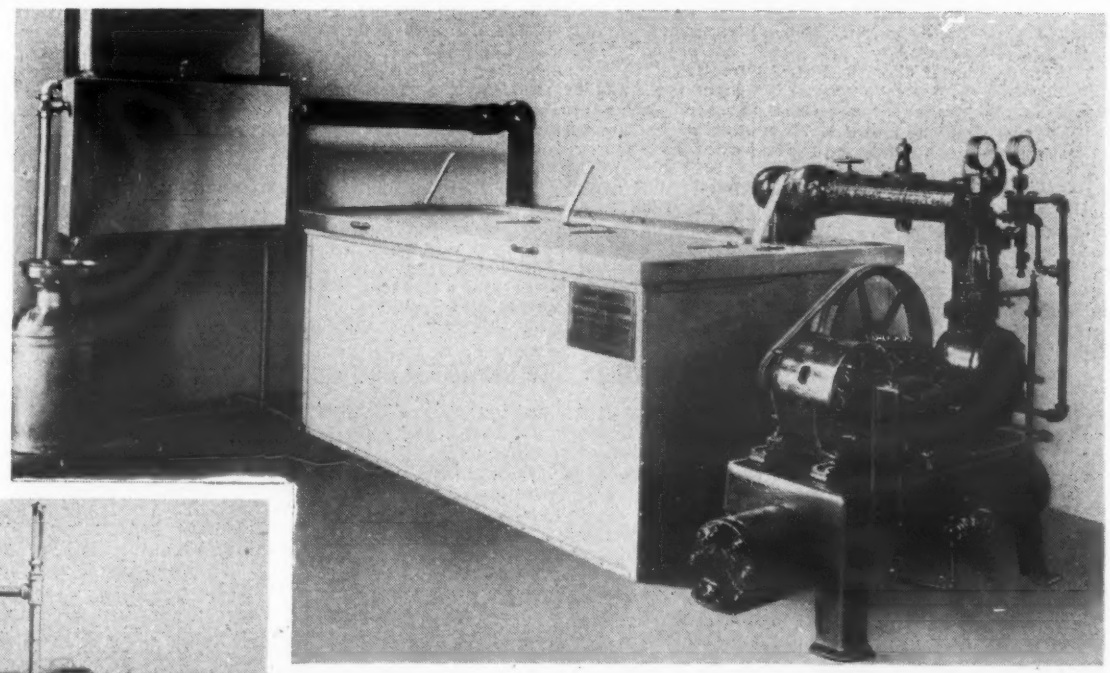
They are built in the form of counter jars, reserve jars and display cabinets, and use Dry Ice (solid carbon dioxide) as a refrigerant.

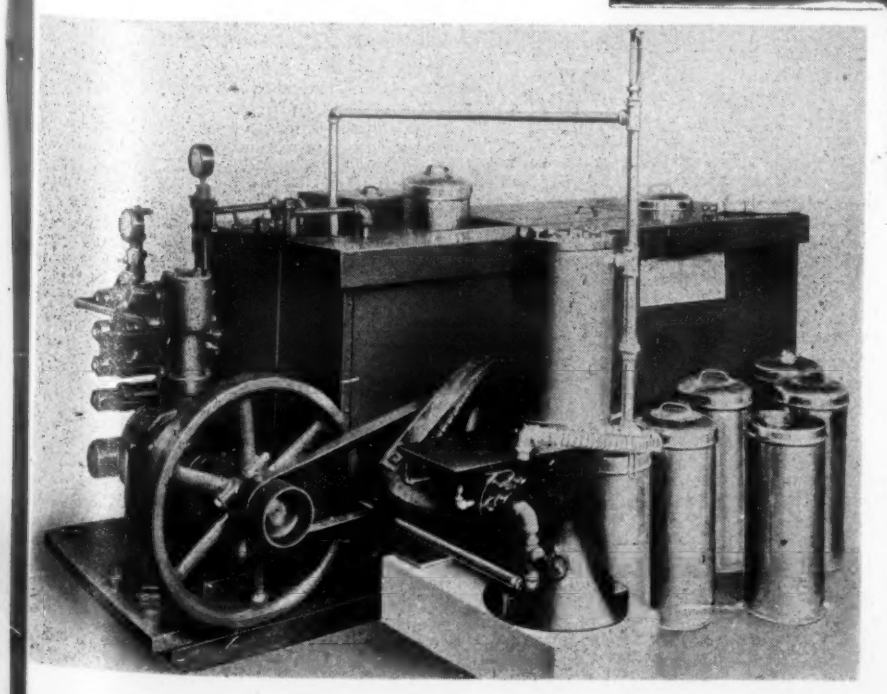
The advantages of the refrigerated thermos bottle lie in the small floor space required, in the outside illustrations of the products within and in the availability of the contained product.

These bottles supplement electric refrigeration by having their contents replenished from the electric cabinet, moving the contents from the cabinet more rapidly than would otherwise be done.

Brunswick-Kroeschell Has Small Machines For Dairy Needs

(Right)—Small dairy unit equipped with aerator, manufactured by the Brunswick-Kroeschell Co., New Brunswick, N. J. Seven milk cooling units ranging from four to ten-can capacity are included in their line. The compressor of the unit shown here is mounted on a cast iron base separate from the cabinet.





(Left)—Standard small portable Brunswick-Kroeschell ice cream unit. This unit, No. 140, has a capacity for making 32 quarts of ice cream per hour or 140 quarts in 4½ hours, its storage capacity is also 140 quarts. The alternate of this machine has a capacity for making 80 quarts of ice cream per hour or 260 quarts during 3¼ hours, its storage capacity being 260 quarts. The unit pictured on the left is equipped with a two and a half horsepower motor.

ESTABLISH SIMPLE TEST FOR QUALITY OF FLEXIBLE CORD

Announcement has been made by the Flexible Cord group of the National Electrical Manufacturers' Association of a new standard which will greatly increase the mechanical strength and improve the serviceability of flexible cord.

The new specification—which becomes effective January 1, 1930, and after which no cord not fully complying with it will be labeled by the Underwriters' Laboratories—reads as follows:

"All dry braids, both individual and overall, shall be braided of cotton, rayon or silk, in such a manner as to result in all adjacent individual parallel threads *actually touching each other*, and shall show no visible open spaces, when observed through a standard braid counter."

It is also stated that cords complying with the National Electrical Code can be identified by the following points:

1. The parallel threads of all braids must touch when viewed under an ordinary single lens pocket magnifying glass.
2. The rubber covering must be tough and stretchy, similar to that on a good grade of code wire, and of the required thickness.
3. The copper conductors must either be tinned or protected by a fibrous covering to prevent corrosion.
4. The minimum copper size for a standard cord is No. 18 AWG, usually made up of sixteen strands of No. 30 AWG.
5. All Underwriters' Laboratories standard cords contain manufacturers' identifying marker threads as required by code, and as given in Underwriters' List of Inspected Electric Appliances.
6. Underwriters' labels further identify Underwriters' Laboratories standard cords.

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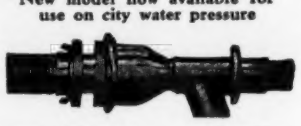

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Type "A" Single Row Continuous Tube McCORD CONDENSER
McCORD "Spiral Fin" continuous tube condensers are made by a patented process that insures a continuous metal to metal contact between the fin and the tube Only seamless, bright, annealed tubing is used, and the fin is corrugated, giving greater radiative efficiency.

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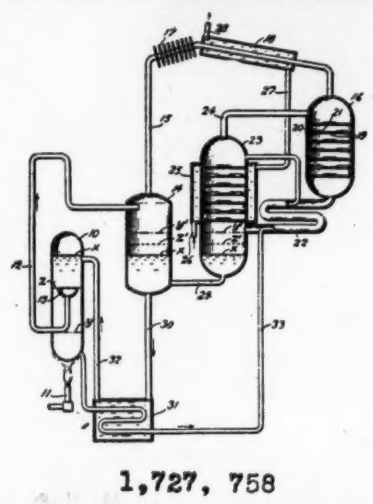
With Seamless Headers
McCord condensers are made in many sizes and designs to meet the requirements of a wide variety of electric refrigerators Efficient radiation and compactness are combined in the unit pictured above

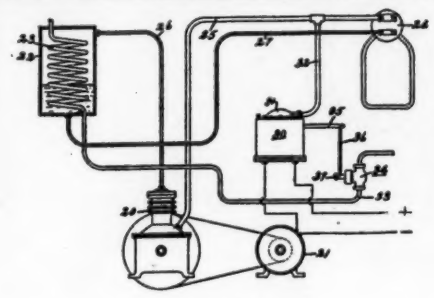
Type "A" Triple Row Continuous Tube McCORD CONDENSER

McCord Radiator & Mfg. Co.
• Detroit •

REFRIGERATION PATENTS ANNOUNCED



1,727, 758



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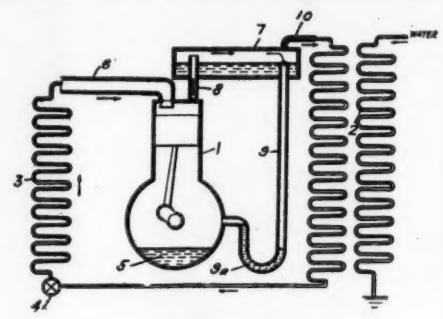

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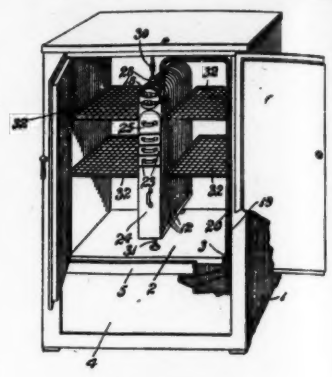

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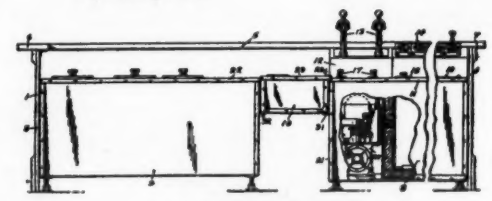

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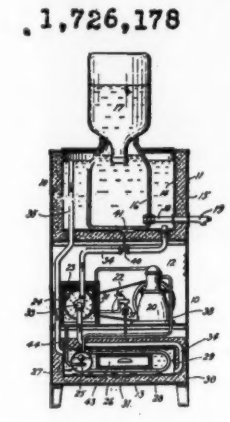

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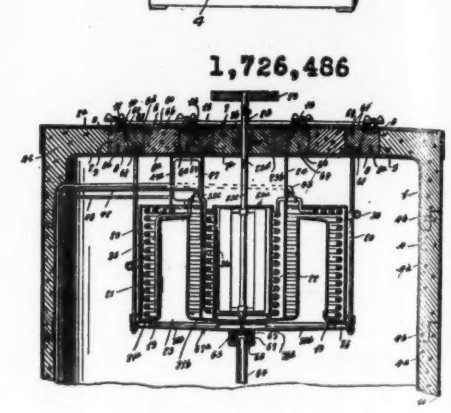


1,725,953

Note—The following refrigeration patents were issued by the United States Patent Office during the period from August 27 to September 24, inclusive.

ISSUED AUGUST 27

1,725,875—AUTOMATIC REFRIGERATING LIQUID FEEDER AND REGULATOR. Otto Luhr, Chicago, Ill. Filed May 22, 1926. Serial No. 111,008. 1 Claim. (Cl. 137—104.)

In an automatic refrigerating liquid feeder and regulator, the combination of a casing, an outlet from said casing, an inlet valve mounted on said casing, a hollow float adapted to reciprocate in the casing and to operate the inlet valve according to the height of the liquid level in the casing, a goose neck pipe connecting the inside of the hollow float with the inside of the casing and forming an integral part of the float, the outside end of said goose neck pipe pointing downwardly, an open basket mounted on said end of the goose neck pipe, and a cork ball arranged in said basket and adapted to be lifted by a liquid rising in the casing and to close the outside end of the goose neck pipe.

1,725,880—DOOR LATCH. Elmer C. Osbeck, Grand Rapids, Mich., assignor to Grand Rapids Brass Company, Grand Rapids, Mich., a Corporation of Michigan. Filed Dec. 4, 1925. Serial No. 73,180. 4 Claims. (Cl. 292—332.)

1,725,933—HOUSEHOLD ELECTRIC REFRIGERATOR. Charles Phillips, Wichita, Kans., assignor to William H. Phillips, Phillips, Wichita, Kans. Filed Aug. 18, 1926. Serial No. 130,008. 3 Claims. (Cl. 62—116.)

1. A refrigerator comprising a cabinet having an opening in the top thereof, a closure for the opening and provided with an opening, a closure for the opening in the first named closure, a cooling system including a brine tank arranged within the cabinet and having a brine chamber open at the top, and a partition surrounding the chamber and extending from the upper side of the tank to the under side of the second named closure.

1,726,068—THERMOSTATIC FLOW REGULATOR. Henry A. Hoeschen, Omaha, Nebr., assignor of one-half to Baker Ice Machine Co., Inc., Omaha, Nebr., a Corporation of Nebraska. Filed Aug. 12, 1927. Serial No. 212,466. 6 Claims. (Cl. 236—93.)

1. A device of the character described, including a perforated tube and a stem contained in said tube, the stem and tube having different coefficients of expansion, a socket slidable on the end of the tube, a ball on said stem, seated in the socket to provide swivel connection between the tube and the stem and a spring in the end of the tube engaging the socket to yieldingly retain the stem in set position and compensate for excessive contraction of the member having the higher coefficient of expansion.

1,726,093—REFRIGERATION. Edward T. Williams, Brooklyn, N. Y., assignor to Servel, Inc., New York, N. Y., a Corporation of Delaware. Filed Apr. 25, 1928. Serial No. 272,639. 6 Claims. (Cl. 62—116.)

1. A water cooler of the inverted bottle type comprising an upper section, an intermediate section and a lower section, a receptacle in said upper section, a vessel within said receptacle adapted to hold drinking water, means for removing drinking water from said vessel, mechanical refrigerating apparatus in the intermediate section, a tank in said lower section, an evaporator in said tank connected to said apparatus for flow of refrigerant and serving to cool liquid in said tank and means to circulate liquid between said receptacle and said tank.

1,726,178—PROCESS OF AND APPARATUS FOR PRODUCING REFRIGERATION. Ransom W. Davenport, Detroit, Mich., assignor to Chicago Pneumatic Tool Company, New York, N. Y., a Corporation of New Jersey. Filed Feb. 15, 1926. Serial No. 88,164. 7 Claims. (Cl. 62—178.)

1. A heat engine utilizing a working substance containing lubricant comprising a compressor, a condenser, and an evaporator connected together to form a closed thermo-dynamic cycle, a still in spaced relation to said compressor and in the connection between said compressor and said condenser and maintained against loss of heat to either for separating the lubricant from said working substance, and means for conducting the separated lubricant into the lubricating system of said compressor.

1,726,341—REFRIGERATING PROCESS. Samuel C. Carney, Tulsa, Okla., assignor to Shell Petroleum Corporation, a Corporation of Virginia. Filed Nov. 26, 1926. Serial No. 150,761. 8 Claims. (Cl. 62—178.)

1,726,344—REFRIGERATING APPARATUS. Ransom W. Davenport, Detroit, Mich., assignor to Chicago Pneumatic Tool Company, New York, N. Y., a Corporation of New Jersey. Filed Apr. 29, 1926. Serial No. 105,372. 21 Claims. (Cl. 62—95.)

1. In a mechanically operated refrigerating outfit, a refrigerator having a compartment for containing perishable articles, an extended evaporator member lining at least a part of said compartment for containing a volatile liquid, and means for withdrawing the vapor of the liquid and cause said member to extract heat from said compartment.

1,726,469—ICE CREAM CONTAINER. Charles Mandell Brenner, Shreveport, La. Filed Sept. 7, 1926. Serial No. 134,102. 1 Claim. (Cl. 220—9.)

1,726,486—REFRIGERATOR AND REFRIGERATING APPARATUS THEREFOR. Delos P. Heath, Grand Rapids, Mich. Filed Apr. 6, 1925. Serial No. 20,912. 5 Claims. (Cl. 62—95.)

5. In a refrigerator apparatus an expansion chamber comprising an inner shell having spaced apart sides and a connecting arch at one end, an outer shell having spaced apart sides and a connecting arch at one end, said arches being spaced apart to provide an unobstructed chamber having arched top and bottom, one of said shells being corrugated, said shells being welded together at contiguous portions between the corrugations and at their peripheries to form a chamber for the expansion of refrigerant.

1,726,519—MECHANICAL REFRIGERATION APPARATUS. Delos P. Heath, Peoria, Ill. Filed Aug. 9, 1926. Serial No. 127,988. 4 Claims. (Cl. 62—115.)

1. In combination a horizontal platform, bars secured at opposite ends transversely of the platform and extending beyond the rear edge thereof, supporting feet extending downwardly from the ends of said bars, a third bar located horizontally between and connected to the rear ends of the first bars whereby an opening is provided between said rear end to the platform, a condenser coil construction located vertically in front of and connected to said third bar having its lower portion extending below the lower side of said platform, and an electric motor, a compressor driven thereby and a control box for the motor mounted upon said platform in front of the coil.

ISSUED SEPTEMBER 3

1,726,629—REFRIGERATING BOX. Wilhelm Rohrbeck, Berlin-Reinickendorf-Ost, Germany. Filed Mar. 29, 1928, Serial No. 265,703, and in Germany Apr. 4, 1927. 2 Claims. (Cl. 62—55.)

1,726,631—REFRIGERATOR CLOSURE. Robert L. Shipman, Bridgeport, Conn., assignor of one-half to Earl D. Sprague, Bridgeport, Conn. Filed May 7, 1927. Serial No. 189,601. 7 Claims. (Cl. 62—48.)

1. In a refrigerator comprising a body having a door opening in a side wall thereof to give access to a compartment within the refrigerator, a door for said opening hinged adjacent its lower edge to swing about a horizontal axis, and upright side walls secured to the door and having sliding engagement with the walls of the body for closing the space at the upright side edges of the door between the door and the body to prevent escape of cold air from the compartment through these spaces when the door is opened.

1,726,699—INTERMITTENTLY - OPERATING ABSORPTION REFRIGERATING MACHINE. George Ferguson, Winterthur - Wulflingen, Switzerland, assignor to the Firm Sulzer Freres Societe Anonyme, Winterthur, Switzerland. Filed Dec. 17, 1927, Serial No. 240,692, and in Switzerland Dec. 24, 1926. 3 Claims. (Cl. 62—118.)

1. In an intermittently operating absorption refrigerating machine the combination of a generator-absorber with a cooling device disposed within the generator-absorber, a pipe supplying refrigerant vapor to the generator-absorber and having its outlet end disposed within and closely surrounded by a tube arranged within the cooling device and having perforations in its lower end, through which the weak solution enters on its way to the vapor supply pipe outlet, or absorption point, at a rate depending upon the quantity of refrigerant vapor to be absorbed and in a manner to promote a suction effect and thereby circulation of the liquid.

1,726,791—REFRIGERATING APPARATUS. Frank W. Andrews, Dayton, Ohio, assignor, by mesne assignments, to Frigidaire Corporation, a Corporation of Delaware. Filed Apr. 28, 1927. Serial No. 187,352. 2 Claims. (Cl. 62—4.)

1. Refrigerating apparatus comprising an evaporator, a condenser, a compressor adapted to withdraw gaseous refrigerant from the evaporator and force it into the condenser, means for cooling the condenser, including a conduit for cooling medium, means for driving the compressor, means responsive to the pressure in the evaporator for controlling the driving means, means for controlling the flow of cooling medium through the conduit, said last mentioned means having a positive mechanical connection with the controlling means.

1,726,805—COMBINATION VALVE, DRIER, AND STRAINER. John O. Carrey, St. Louis, Mo., assignor to C. & C. Engineering Co., Inc., St. Louis, Mo., a Corporation of Missouri. Filed Aug. 25, 1926. Serial No. 131,459. 8 Claims. (Cl. 62—8.)

1. In a valve device for refrigerating apparatus the combination of a casing comprising a pot, a cover therefor, and a partition wall arranged in said pot and dividing the interior thereof into a lower inlet chamber and an upper outlet chamber, valve means for controlling the communication between said chambers, a hollow expansible member disposed in said outlet chamber and connected to said valve means, said expansible member being maintained under a fixed predetermined fluid pressure with respect to the fluid pressure prevailing in said outlet chamber whereby said expansible member is actuated to open and close said valve means in a definite relation with the pressure prevailing in said outlet chamber, and automatically closed means for varying said fixed fluid pressure in said expansible member.

1,726,887—CURTAIN FOR REFRIGERATOR CAR DOORS. Jesse C. Clamp, Helena, Ark. Filed Oct. 12, 1926. Serial No. 141,139. 6 Claims. (Cl. 156—60.)

1,727,018—EVAPORATOR FOR REFRIGERATION MACHINES. Raymond E. Sabin, Flushing, N. Y. Filed Nov. 18, 1926. Serial No. 149,262. 4 Claims. (Cl. 62—95.)

1. An evaporator unit for refrigeration machines, comprising a cast metal tank for heat absorbing liquid and a hollow structure about which the tank is cast, said structure being of higher melting metal than the tank, and constituting an evaporating chamber having a non-porous wall in intimate thermal contact with the tank.

1,727,187—REFRIGERATING DEVICE. Morris F. Weinrich, Leonia, N. J., assignor to Silverice, Inc., a Corporation of New York. Filed June 7, 1928. Serial No. 283,715. 14 Claims. (Cl. 62—1.)

1. A refrigerating device comprising a closed container, a refrigerable material therein, and a thermal conductor engaging the walls of the container and projecting into said material.

ISSUED SEPTEMBER 10

1,727,530—ICELESS JACKET. Richard C. Washburn, Saugerties, N. Y. Filed Oct. 3, 1927. Serial No. 223,754. 7 Claims. (Cl. 150—52.)

1,727,556—APPARATUS FOR MANUFACTURING ARTIFICIAL ICE. William F. Pharr, Birmingham, Ala. Filed May 24, 1927. Serial No. 193,850. 9 Claims. (Cl. 62—159.)

1,727,713—REFRIGERATOR. Charles G. Juneau, Wauwatosa, and Walter C. Marshall, Milwaukee, Wis. Filed Apr. 4, 1927. Serial No. 180,640. 2 Claims. (Cl. 62—47.)

1. A refrigerator provided with a refrigerant-holding compartment in the upper end thereof, foodstuff holding compartments arranged in a vertical tier beneath, all of said compartments having solid sides and bottom walls, the bottom of the refrigerant-holding compartment having an opening, an air duct leading from said opening downwardly along a side wall of the foodstuff holding compartments and open at the lower end of the refrigerator, a warm air duct leading from the bottom of the refrigerator adjacent the opposite side wall of the foodstuff holding compartment and communicating with the upper end of the refrigerant-holding compartment, an air passage beneath the lowermost foodstuff compartment communicating with the lower ends of both air-ducts, the side walls of the foodstuff holding compartments coincident with the upper ends thereof having openings, and adjustable portions secured at the lower ends of the openings and sloping upwardly outward into both of said ducts, for inducing direct inflow of cold air from the cold air duct into each of said foodstuff holding compartments, and for effecting eduction action at the outlet openings of each of said chambers.

1,727,758—REFRIGERATION. Thore Martin Elfving, Stockholm, Sweden, assignor to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed June 10, 1927, Serial No. 197,775, and in Germany, Dec. 6, 1926. 14 Claims. (Cl. 62—179.)

1. Absorption refrigerating apparatus comprising a generator, an absorber, a condenser, an evaporator, an intermediate vessel situated to allow liquid to flow by gravity from the absorber to said vessel and by gravity from said vessel to the generator, and means for periodically creating an excess of pressure in said generator comprising conduit means for conveying vapor from the generator to said vessel connected to the generator so as to form a conduit for periodic flow of liquid from the generator to the vessel on changes of liquid level in the generator, and to periodically form liquid columns interposed between the generator and condenser to prevent flow of vapor therebetween.

1,727,777—REFRIGERATOR. Charles G. Juneau, deceased, Wauwatosa, Wis., by Anna K. Juneau, administratrix, Wauwatosa, Wis., and Walter C. Marshall, Milwaukee, Wis. Filed May 25, 1928. Serial No. 280,536. 7 Claims. (Cl. 62—64.)

1. A refrigerator having in its top a refrigerant holding compartment formed by a baffle arranged to constitute the bottom and side walls of the compartment, the side wall being in spaced relation with the main side and top walls of the refrigerator, a plurality of separate foodstuff holding compartments arranged vertically beneath the bottom of the baffle and spaced from two of the main side walls of the refrigerator so as to provide vertically extending air passages on opposite sides of said last mentioned compartments, said passages communicating with each other beneath the lower food-holding compartment, one passage communicating at top with the bottom of the refrigerant compartment, while the other passage communicates with the top of said refrigerant compartment, the side walls of the foodstuff compartments adjacent to the tops thereof being provided with shutters hingedly connected at bottom to said side walls so as to swing outwardly into said air passages, and means connected to the shutters of each compartment whereby said shutters may simultaneously be moved into open or closed positions.

REFLECT ACTIVITY DURING YEARS 1926-7

1,727,941—SODA FOUNTAIN. John R. Replogle, Detroit, Mich., assignor, by mesne assignments, to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Aug. 23, 1926. Serial No. 130,839. 2 Claims. (Cl. 225—28.)

2. In a dispensing apparatus, the combination of a pair of spaced cabinets, having supporting means on the adjacent ends thereof, and a detachable work table carried intermediate said cabinets by said supporting means.

1,727,945—MACHINERY SUPPORT. Charles C. Spreen, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Dec. 30, 1926. Serial No. 157,949. 2 Claims. (Cl. 248—16.)

1. A vibration reducing support for an electric motor comprising a base, vertical brackets, each having a corrugated structure, said brackets being detachably attached to said base, a soft rubber member provided with a flange fitting into each of said apertures, and a band for clamping said flange to the frame of said motor, said motor being entirely supported by said rubber members and said brackets.

1,727,946—REFRIGERATION. Charles C. Spreen, Detroit, Mich., assignor to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Feb. 24, 1927. Serial No. 170,554. 6 Claims. (Cl. 62—95.)

6. In combination with a refrigerator

1. In combination with a refrigerator cabinet having an interior wall forming a chamber for receiving a cooling unit and a chamber for storing food, said wall being formed to permit circulation of air between said chambers; of means in said cabinet for removing moisture from the circulatory air prior to its contact with said cooling unit.

1,727,974—DEVICE FOR CIRCULATING BRINE. Ole G. Halverson, Chicago, Ill. Filed May 25, 1928. Serial No. 280,407. 7 Claims. (Cl. 259—97.)

1,727,998—COOLER AND HUMIDIFIER. Ralph D. Matteson, Eagle, Idaho. Filed June 30, 1928. Serial No. 289,474. 3 Claims. (Cl 261—104.)

1,728,081—ICE CONVEYANCE. Albert A. Rust, Cincinnati, Ohio. Filed Sept. 13, 1926. Serial No. 135,001. 1 Claim. (Cl. 280—53.)

1,728,146—CREAM COOLER. Clarence John Wiebusch, Lake City, Minn. Filed Mar. 26, 1927. Serial No. 178,739. Renewed Feb. 14, 1929. 2 Claims. (Cl. 257—199.)

ISSUED SEPTEMBER 17

17,434—REFRIGERATING APPARATUS. Jesse G. King, Dayton, Ohio, assignor, by mesne assignments, to Frigidaire Corporation, a Corporation of Delaware. Filed Sept. 30, 1927. Serial No. 223,197. Original No. 1,588,379, dated June 8, 1926, Serial No. 664,810, filed Sept. 26, 1923. 20 Claims. (Cl. 62—95.)

13. Refrigerating apparatus, including in combination, a cooling device having a freezing chamber, the freezing chamber having an opening, an ice-making container adapted to be inserted in the chamber through the opening, a closure for the opening, and a skeleton structure connecting the closure to the container and spacing it therefrom.

1,728,210—TRAY FOR REFRIGERATION SYSTEMS. George W. Mason, Detroit, Mich., assignor to Copeland Products, Inc., Detroit, Mich., a Corporation of Michigan. Filed June 14, 1926. Serial No. 115,996. 1 Claim. (Cl. 220—22.)

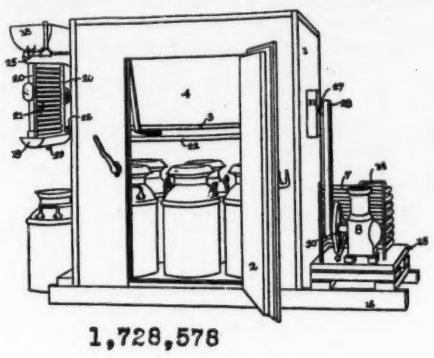
In combination, a water tight pan, a plurality of grid members removably received in said pan, one above the other, said grid members each comprising strips of metal lying in a vertical plane and intersecting each other to form rectangular spaces of substantial depth between each other, and a horizontal sheet of metal removably received in said pan between the adjacent surfaces of each pair of grid members whereby to divide the interior of said pan into a plurality of rectangular superimposed chambers.

1,728,364—ICELESS REFRIGERATOR. Albert Rivard, Ottawa, Ontario, Canada, assignor of thirty-seven and one-half per cent to Gaston Rivard and twenty-five per cent to Romain Lanthier, Ottawa, Canada. Filed Sept. 20, 1927. Serial No. 220,760. 8 Claims. (Cl. 62—94.)

1. A refrigerator comprising a cabinet with heat insulating walls, spaced covered trays superimposing one another, drain pipes connecting said trays, a mixture of sodium nitrate ($NaNO_3$) and gravel in said trays, moisture diffusing means provided in said cabinet and means for permitting ingress of said moisture to the interior of said trays.

1,728,535—BOTTLE-COOLING BOX. Chester A. Frick, Muncie, Ind., assignor to Glascock Brothers Mfg. Co., Muncie, Ind., a Corporation of Indiana. Filed Feb. 6, 1928. Serial No. 252,090. 2 Claims. (Cl. 312—36.)

1. In a device of the character described, the combination with an enclosing casing, including angle corner posts and side panels secured to said corner posts, of supporting members mounted within the angle of the corner posts, a substantially rectangular frame arranged to rest on said supporting members, outer U shaped corrugated tub carried by said frame, cross members extending between the front and rear members of said frame, and a substantially U shaped corrugated tub carried



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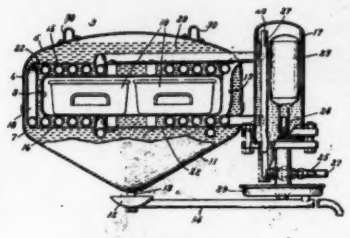

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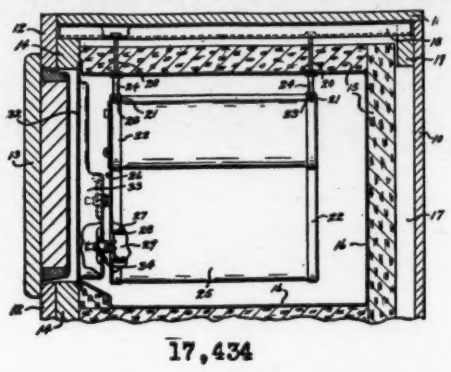

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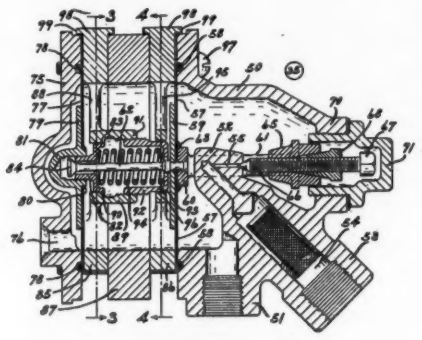

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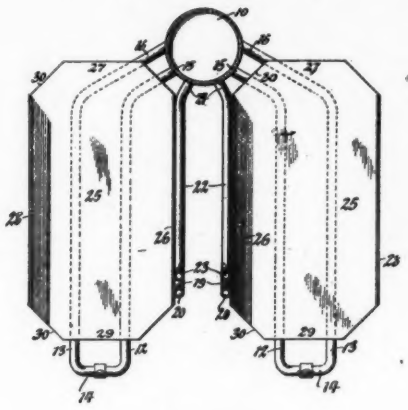

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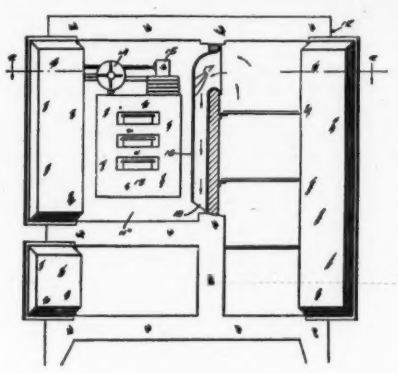

1,727,946

by said cross members and arranged to co-operate with said outer tub to form a plurality of U shaped channels.

1,728,572—MEANS OF KEEPING MILK COOL IN CANS WHILE IN TRANSIT. Erik A. Pearson, Portland, Ore. Filed Aug. 1, 1928. Serial No. 296,840. 4 Claims. (Cl. 62—92.)

1,728,578—REFRIGERATING APPARATUS. Charles C. Spreen, Detroit, Mich., asignor, by mesne assignments, to Kelvinator Corporation, Detroit, Mich., a Corporation of Michigan. Filed Dec. 15, 1924. Serial No. 755,865. 8 Claims. (Cl. 62—116.)

1. Dairy apparatus comprising, in combination, an insulated storage member, a brine tank in air circulating relation therewith, a compressor, a condenser, and an expansion coil operatively connected together and constituting a unitary part of said apparatus, said expansion coil being located in cooling relation with said brine tank, a milk cooler located outside said storage chamber and comprising a plurality of tubes over which milk can trickle, circulating pipes connecting said tank with said tubes, a pump operatively connected to said circulating pipes, and a prime mover operatively connected to said compressor and pump.

1,728,636—REFRIGERATOR. John Stewart, Detroit, Mich. Filed Dec. 19, 1928. Serial No. 327,015. 4 Claims. (Cl. 62—75.)

1,728,643 — REFRIGERATION. Baltzar Carl von Platen and Carl Georg Munters, Stockholm, Sweden, assignors to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed Apr. 14, 1927, Serial No. 183,675, and in Sweden, May 1, 1926. 17 Claims. (Cl. 62—179.)

1. Refrigerating apparatus comprising vessels constituting an absorber and an evaporator, an alternating motion member comprising a movable body, connections between said member and said vessels, said member being adapted upon movement of said body to transfer fluid through said connections from one vessel to the other, and means motivated by changes of condition within said apparatus to actuate said member.

8. Those steps in the process of refrigerating through the agency of an absorption system, including an absorber and an evaporator which consists in alternately causing a rise and fall of pressure in the system, moving a body due to said rise and fall of pressure and transporting gaseous fluid between the evaporator and absorber due to movement of said body.

1,728,696—REFRIGERATING COUNTER. Emmet Platten, Green Bay, Wis. Filed Mar. 14, 1927. Serial No. 175,254. 3 Claims. (Cl. 62—37.)

3. A conduction refrigerating counter comprising a depressed body portion for the reception of the material to be chilled, a standard refrigerating unit having upper and lower spaced pipes, a plate positioned below the upper of said pipes, spacers positioned between said plate and the bottom of said body portion, and fasteners passing through said plate and securing said plate in position, said plate being springy and providing a yielding pressure against said upper pipes and holding such pipes in binding engagement and direct contact with said body portion.

1,728,742—REFRIGERATING APPARATUS OF THE ABSORPTION TYPE. Edmund Altenkirch, Fredersdorf, near Alt-Landsberg, Germany, assignor to Siemens-Schuckertwerke Gesselschaft mit beschränkter Haftung, a German Corporation, doing business at Siemensstadt, Berlin, Germany. Filed June 7, 1923, Serial No. 643,943, and in Germany, June 16, 1922. 21 Claims. (Cl. 62—119.)

2. In refrigerating apparatus of the absorption type, the combination of evaporating means, means to convert a gaseous fluid to condensed phase, separate gas absorbing means, means allowing the separation of gas and liquid during the operation of said absorbing means, a solution of a gas in a condensed phase, and means operative by lifting action of gas rising in a liquid for conveying such solution from the absorbing means to said separating means.

15. Refrigerating apparatus of the continuous absorption type comprising a glass evaporator.

1,728,804 — REFRIGERATING DEVICE. Frederick H. Rayfield, Atlanta, Ga., assignor of one-half to Paul M. Potter, Atlanta, Ga. Filed June 9, 1928. Serial No. 284,198. 7 Claims. (Cl. 62—141.)

1. A refrigerating device, including a tank for containing a liquid to be cooled and comprising a plurality of compartments, the compartment at one end of the device having an inlet and the compartment at the other end an outlet, a refrigerating coil positioned in each of said compartments proportionately diminishing in length from the inlet to the outlet compartments, means for successively conducting the liquid to be acted on from the bottom of one compartment to the top of the adjacent compartment.

1,728,827—REFRIGERATING APPARATUS. Charles L. Heisler, Schenectady, N. Y., assignor to General Electric Company, a Corporation of New York. Filed Apr. 22, 1927. Serial No. 185,849. 10 Claims. (Cl. 62—95.)

1. A refrigerator cooling unit comprising spaced inner and outer casings, said inner casing forming a receptacle adapted to receive material to be frozen, a liquid in the space between said casings, means for conducting refrigerant through said liquid, and means immersed in said liquid tending to confine the liquid cooled by the refrigerant toward the walls of the inner casing.

9. A refrigerator cooling unit comprising a header, a substantially horizontal cooling coil comprising a plurality of loops, the ends of the coil being connected with the header at vertically spaced points thereof, and means for maintaining liquid refrigerant in the header at a level above both connections therewith of the cooling coil, whereby a rapid circulation of liquid refrigerant is induced in the coil.

1,728,887 — ICELESS REFRIGERATOR. Edwin V. Heaford, Denver, Colo., assignor to Joseph Rosenthal and Samuel Horwitz, Denver Colo. Filed Feb. 18, 1928. Serial No. 255,373. 4 Claims. (Cl. 62—90.)

1. A refrigerator comprising, in combination, an outer casing, a second casing located within the outer casing, the outside of the walls of the second casing being spaced from the inside of the walls of the outer casing so as to form a space, a shallow pan forming the top of the second casing, a liquid absorbent material extending downwardly over the outside of the second casing, said absorbent material having its upper edges in the shallow pan, a gutter extending around the lower end of the second casing for receiving water from the absorbent material, a heat exchange device located within the second casing, means for circulating cold water through said device and means for continuously supplying water to the shallow pan on top of the second casing.

ISSUED SEPTEMBER 24

1,728,970—REFRIGERATING APPARATUS. Harry B. Hull and Clarence Warner, Dayton, Ohio, assignors, by mesne assignments, to Frigidaire Corporation, a Corporation of Delaware. Filed August 25, 1924. Serial No. 733,884. 7 Claims. (Cl. 62—8.)

1. In refrigerating apparatus including a closed circuit for refrigerant, in combination, a container for liquid refrigerant, an evaporator, a valve for controlling the passage of refrigerant from the container to the evaporator, means for opening and closing the valve in response to the pressure within the evaporator, and means independent of said opening and closing means and responsive to a low temperature of the refrigerant for positively closing the valve.

1,729,058 — REFRIGERATOR DISPLAY COUNTER. Len A. Banta, Clearfield, Pa. Filed Sept. 13, 1927. Serial No. 219,345. 3 Claims. (Cl. 62—37.)

1. A refrigerator display counter having a plurality of compartments arranged one above another therein, said compartments being insulated from each other with no communication therebetween, and cooling coils arranged in the upper portion of each of the compartments, the cooling coils for each compartment being entirely separate from the coils for the other compartment to provide independent cooling thereof.

1,729,081—REFRIGERATION. Ernest B. Miller, Baltimore, Md., assignor to The Silica Gel Corporation, Baltimore, Md., a Corporation of Maryland. Continuation of applications Serial No. 675,929, filed Nov. 20, 1923; Serial No. 688,020, filed Jan. 23, 1924; and Serial No. 236,322, filed Nov. 28, 1927, and in Great Britain and Irish Free State, Oct. 25, 1924. This application filed Aug. 3, 1929. Serial No. 383,319. 17 Claims. (Cl. 62—118.)

1. A method of refrigeration consisting in evaporating a liquid and adsorbing the vapor in the substantial absence of permanent gases, in a porous material having pores of such size that it will adsorb water vapor under static conditions to such an extent as to contain not less than about 10% of its own weight of water when in equilibrium with water vapor at substantially 30° C. and a partial pressure of substantially 22 mm. of mercury.

1,729,082—REFRIGERATING APPARATUS. Ernest B. Miller and Walter L. Edel, Baltimore, Md., assignors to The Silica Gel Corporation, Baltimore, Md., a Corporation of Maryland. Filed Mar. 11, 1925. Serial No. 14,758. 7 Claims. (Cl. 62—153.)

1. A railway car refrigerating plant, comprising in combination a railway car having a compartment closed from the rest of the car but open to the atmosphere, an air-cooled adsorber in said chamber having a charge of porous adsorbing material therein, and an evaporator always containing a quantity of liquid in the main portion of said car connected to said adsorber.

1,729,083—REFRIGERATION PROCESS AND APPARATUS. Ernest B. Miller and Walter L. Edel, Baltimore, Md., assignors to The Silica Gel Corporation, Baltimore, Md., a Corporation of Maryland. Filed Mar. 11, 1925. Serial No. 14,759. 16 Claims. (Cl. 62—179.)

1. A process of refrigeration consisting in evaporating a liquid, adsorbing the vapor in the pores of a solid porous material in the substantial absence of permanent gases, liberating the vapor thus adsorbed, and venting liberated vapor together with any permanent gases present.

1,729,182 — REFRIGERATOR. Glenn M. Osborn, Salt Lake City, Utah. Filed Oct. 25, 1926. Serial No. 144,145. 1 Claim. (Cl. 62—90.)

1,729,355—REFRIGERATING APPARATUS OF THE ABSORPTION TYPE. Carl Georg Munters, Stockholm, Sweden, assignor to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed Mar. 16, 1927, Serial No. 175,649, and in Sewen, Mar. 16, 1926. 9 Claims. (Cl. 22—119.5.)

1. Refrigerating apparatus of the absorption type, comprising a generator, a condenser, an evaporator, an absorber, said generator having a hollow member projecting thereinto, said hollow member having a sleeve portion outside the generator, a gas burner directed into said hollow member, and baffling means within said hollow member, said baffling means having a passageway therethrough for the passage of products of combustion.

,729,403—COOLING UNIT FOR REFRIGERATORS. Franklin G. Slagel, Buffalo, N. Y., assignor to Fedders Manufacturing Company, Inc., Buffalo, N. Y., a Corporation of New York. Filed June 5, 1928. Serial No. 282,951. 4 Claims. (Cl. 62—95.)

1. A cooling unit for refrigerators comprising a vaporizing chamber, a plurality of transverse refrigerant loops arranged transversely of said chamber and connected therewith; and a plurality of longitudinal refrigerant loops arranged lengthwise of said chamber and connected therewith and comprising a comparatively wide long outer loop and a comparatively narrow short inner loop arranged within said outer loop.

1,729,593—COOLING SYSTEM. George A. Peterson, Hollis, Okla. Filed July 15, 1926. Serial No. 122,698. 1 Claim. (Cl. 261—29.)

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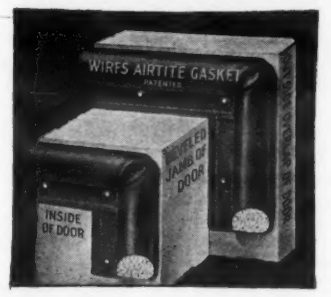

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